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QUALITY OF RED RIVER VALLEY POTATOES IN VARIOUS TYPES OF CONSUMER PACKAGES[1,2]

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There is a growing tendency toward packing potatoes in consumer packages. For this reason, experiments were conducted to determine the

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[1] Report of a study made under the Research and Marketing Act of 1946.

[2] Dr. M. A. Smith and Mr. Vincent A. Reubelt, of the Division of Fruit and Vegetable Crops and Diseases, assisted with some of the inspections. Some of the potatoes used in these experiments were furnished by the Red River Valley Potato Growers Association. Packages used in these tests were furnished by John Whitnack and Walter Fankhanel, of the Associated Potato Growers, Grand Forks, N. Dak; J. B. Sickel, of the International Paper Co., Chicago, Illinois; Dr. Wm. Aldrich, of the American Fruit Growers Inc., Hagerstown, Md.; Food Packaging, Milwaukee, Wisconsin; Shellmar Products Corp., Mt. Vernon, Ohio; and Flexible Package Co., Chicago, Illinois. The cooperation of these individuals and firms is gratefully acknowledged.

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merits of various types of packages in protecting potatoes from loss of market quality. Special consideration was given to the influence of various types of packages on greening resulting from exposure to light (frequently referred to as sunburn) as this is an important defect found in retail stores. Studies on the Boston, Massachusetts and the Maine markets showed that such greening was second only to cuts and bruises in importance as a grade defect in Maine potatoes (4). A similar observation was made on the New York City market (2) where it was found that more than a fifth of the external defects were caused by greening. Studies by the Oregon Experiment Station (3) showed that greening occurred in 23.3 per cent of the Oregon U. S. No. 1 potatoes on California markets. No greening was found on potatoes in paper bags in the Oregon studies. Other important factors in loss of salability, such as decay and weight loss, were also considered in comparing packages. Since washing potatoes is a common practice, studies of the effect of washing and different degrees of drying on keeping quality were also made. In some of the tests potatoes treated with red colored wax were included because in the Red River Valley this was a standard practice with washed red potatoes during the 1949-1950 shipping season.

Description of Bags Used

The following types of bags were used during the course of these experiments:

1. Solid paper, double wall, wet strength.
2. Paper, with mesh window, double wall, wet strength. Window approximately 3¼ x 7 inches on the side covered with ¼ inch mesh material.
3. Cotton mesh, made of ⅕ inch cotton mesh, with a tightly woven band around the center. This band occupied about ⅓ of the area. Both purple and orange colored bags were used.
4. Paper mesh, made of ¼ inch twisted paper mesh material. This bag also had a solid band similar to that in the cotton mesh bags. Both purple and orange colored bags were used.
5. Elastic top polyethylene. This bag had a 1¾ inch diameter top opening which could be stretched to 5 inches for filling.
6. Elastic top polyethylene, perforated (like No. 5, except for eighteen 5/16-inch holes in the sides).
7. Elastic top pliofilm, perforated. This bag had eighteen 5/16-inch holes in the sides and an elastic top like the polyethylene bag.
8. Tied top polyethylene. This bag had an open top which could be tied shut after filling.

9. Tied top polyethylene, perforated. This bag was perforated with 18 quarter-inch holes in the sides; otherwise, like No. 8.

10. Draw string FF pliofilm, perforated. This bag had a paper band fastened to the top, which had a drawstring closure attached. It had 22 quarter-inch holes in the sides.

All the bags used were 10-pound capacity except the pliofilm bags (No. 7 and 10), which were of 5-pound capacity. All but the polyethylene and pliofilm bags have been used rather extensively commercially. The perforated stretch top polyethylene bags have been used to a limited extent commercially. All of the pliofilm bags tended to tear during filling. All others were satisfactory in this regard.

Greening and Weight Loss of Waxed and Unwaxed Potatoes in Various Types of Packages

Washed Triumph potatoes which were held in a commercial warehouse at approximately 40°F. in burlap sacks for several days to dry were used in this experiment which was conducted during the period Nov. 17 to 24, 1949. Potatoes with serious defects were removed from the lot so that those used in the experiment were of approximately U. S. No. 1 grade. The waxed potatoes were treated with a red colored vegetable wax containing 15 per cent solids applied with a foam waxer immediately after washing, at the rate of approximately 1.35 gallons per 10,000 pounds. The types of packages used for this experiment are given in table 1.

The bags of potatoes were placed on the floor of a room with fluorescent lights in the ceiling, where illumination was not greater than could be expected in normal retail handling. The light on the bags of potatoes was approximately 25 foot candles. The lights were on 9 hours a day during the 8 day period. This rather long exposure was made to secure conditions as severe as would ever be encountered commercially. Five bags of potatoes for each type of bag were used in this experiment. The temperature averaged 71°F. and the relative humidity 32 per cent.

Greening was classified on the basis of U. S. grades into 2 classes: severe being sufficient to throw potatoes out of the U. S. No. 2 grade and moderate being serious enough to bar a potato from the U. S. No. 1 grade. In table 1 total greening includes both moderate and severe greening.

It will be noted that waxing had no significant effect on greening. The masking effect of red-colored wax on greening which was observed was not unexpected, for greening is normally more difficult to detect on red varieties than on white ones and is proportional to their degree of redness.

As was expected, the solid paper bags gave very good protection against greening. The paper bags with mesh windows allowed some light to

TABLE 1.—*Greening and weight loss of waxed and unwaxed Triumph potatoes in various types of packages held 8 days under 9 hours of artificial light daily at temperatures averaging 71°F. and humidity 32 per cent.*

Type of Package	Greening						Weight Loss		
	Severe			Total					
	Waxed	Not Waxed	Average	Waxed	Not Waxed	Average	Waxed	Not Waxed	Average
	Per cent	Per cent	Per cent	Per cent	Per cent	Per cent	Per cent	Per cent	Per cent
1. Solid paper	0	0	0	0.9	1.1	1.0	2.16	2.25	2.20
2. Paper with mesh window	6.0	6.2	6.1	28.7	38.3	28.5	2.17	2.52	2.34
3a. Cotton mesh, purple	18.5	6.3	12.4	60.1	67.0	63.6	2.52	2.53	2.52
3b. Cotton mesh, orange	15.3	16.5	15.9	77.2	64.9	71.0	2.49	2.55	2.52
4a. Paper mesh, purple	15.2	6.4	10.8	60.8	62.6	61.7	2.44	2.54	2.49
4b. Paper mesh, orange	13.9	6.4	10.2	58.0	55.9	57.0	2.48	2.52	2.50
5. Elastic top polyethylene, not perforated	17.6	15.7	16.6	67.5	75.4	71.4	0.41	0.49	0.45
6. Elastic top polyethylene, perforated	......	18.9	......	......	76.9	......	......	1.57	......
Average (perforated polyethylene omitted)	12.4	8.2	......	50.5	52.2	......	2.10	2.20	......

strike the potatoes and this caused some greening. All of the bags which permitted more or less complete visibility also allowed considerable greening to occur. There were no important differences in greening of tubers in the different types or colors of mesh bags. Slightly more greening occurred in the polyethylene than in the mesh bags.

Weight loss of the potatoes was about 2.5 per cent in the mesh bags and those with mesh windows; it was slightly less in the solid paper bags and amounted to about 0.45 per cent in the non-perforated elastic top polyethylene bags. There were no important differences in weight loss between types of mesh bags. Waxing resulted in a very slight reduction in weight loss in comparison with the unwaxed lots but this was of little commercial significance.

Although the non-perforated polyethylene bags were very effective in reducing weight loss, moisture condensed in them even though there was a 1¾ inch opening at the top. This detracted from the appearance of the package and also made conditions favorable for the development of mold.

The results on comparative weight loss in mesh and paper bags with waxed and unwaxed potatoes are in general agreement with those reported by Alban (1).

Influence of Greening on Cooking Quality

Cooking tests were made to determine the effect of greening on appearance and flavor of waxed and unwaxed potatoes. The results are given in table 2. Quality of the cooked product whether waxed or not waxed was adversely affected by greening, particularly if greening was severe, and the adverse effect was especially noticeable when potatoes were boiled with their peels on. It was noted in potatoes cooked in that way that the red color in the waxed potatoes penetrated into the flesh of the tubers when they were punctured with a fork. It was also observed that the water in which the potatoes were boiled was cloudy, developed a waxy scum, and had a pinkish color.

Influence of Length of Exposure to Light on Greening and Weight Loss of Pontiac Potatoes in Various Types of Bags

Washed, unwaxed Pontiac potatoes of which about 85 per cent were U. S. No. 1 grade that had been stored in a commercial storage were used in this experiment, which was conducted between January 17 and 23, 1950. The types of consumer bags used are given in table 3. The bags were laid on the floor of a room with fluorescent lights burning 9 hours a day. The temperature of the room during exposure was 70°F. and the relative humidity 16 per cent. Ten bags of each type were used and 2 of each

TABLE 2—*Cooking quality of waxed and unwaxed Triumph potatoes with varying amounts of greening*

		Quality Rating[1] When Cooked by Method Indicated							
		Baked		French Fried		Peeled, boiled		Boiled, unpeeled	
Waxing	Greening	Color	Flavor	Color	Flavor	Color	Flavor	Color	Flavor
None	None	85	100	85	90	90	100	85	90
Waxed	None	85	100	85	90	90	100	80	90
None	Moderate	85	90	85	90	87	95	75	85
Waxed	Moderate	85	90	85	90	85	95	75	85
None	Severe	70	75	70	80	75	85	60	75
Waxed	Severe	75	75	70	80	70	85	65	75

[1] Rating made on basis of 0 to 100. A rating of color or flavor below 70 is considered unsatisfactory.

TABLE 3.—*Influence of length of exposure on greening and weight loss of Pontiac potatoes in various types of bags, held at 70°F. and 16 per cent relative humidity.*

	Severe Greening after Holding for Number of Days Indicated					Total Greening after Holding for Number of Days Indicated					Weight Loss after Holding for Number of Days Indicated				
Type of Bag	1	2	3	5	7	1	2	3	5	7	1	2	3	5	7
	Per cent					Per cent					Per cent				
1. Solid paper	0	0	0	0	0	0	0	0	0	1.0	0.6	1.2	1.4	1.9	2.6
2. Paper with mesh window	0	0	0	0	3.4	0	0	0	4.7	10.1	0.8	1.4	1.5	2.3	2.3
3. Cotton mesh	0	0	0	0	0.6	0	2.6	21.0	27.1	48.4	0.8	1.4	2.0	2.5	2.5
4. Paper mesh	0	0	0	0	2.0	0	5.4	2.1	28.5	36.4	0.9	1.4	1.6	2.0	2.4
6. Elastic top polyethylene-perforated	0	0	0	3.4	4.5	0	8.1	10.3	32.4	51.8	0.4	0.7	1.2	1.4	2.0
7. Elastic top pliofilm-perforated	0	0	0	0	6.8	0	7.0	20.3	38.6	41.3	0.4	0.8	1.2	1.6	2.0

Figure 1.—Packing consumer bags with a pre-packaging wheel.

Figure 2.—Weighing and tying consumer bags removed from wheel.

Figure 3.—Automatic filling and weighing machine for packing consumer bags of potatoes.

Figure 4.—Close up of automatic filling and weighing operation.

were inspected after 1, 2, 3, 5 and 7-day exposures.

The relative values of the bags in preventing weight loss and greening of the potatoes were similar to those obtained in the first test.

Greening of the tubers developed in all bags that permitted some visibility. A small amount was present after 2 days, but it was generally not serious until after 3 day's exposure. Severe greening was generally not apparent until after 7 day's exposure.

Weight Loss and Keeping Quality of Potatoes of 3 Degrees of Dryness When Packed in Various Types of Packages (Holding Test)

Triumph potatoes of which about 85 per cent were U. S. No. 1 grade that had been held in commercial storage until February 20, 1950, were used in this experiment. The potatoes for the wet pack were washed in a commercial washer and then packed directly from the grader line. The potatoes which were packed when only partially dried were washed and run over a water eliminator which consisted of a series of blanket covered rollers in contact with steel wringer rollers. This removed some but not all of the free water from the surface of the potatoes. The potatoes for the dry pack were held under an unheated airblast for 1 hour. The types of packages used are given in table 4, which also gives the condition and weight loss after a 7-day holding period in the dark at a temperature of 63°F. and relative humidity of 20 per cent.

It will be noted, in table 4, that the condition of the potatoes was satisfactory and except in the non-perforated polyethylene bags (No. 5 and 8) and in the perforated tied top polyethylene bags (No. 9) when the potatoes were packed wet or slightly moist. These last developed slight decay. Apparently the perforations alone did not permit sufficient ventilation to prevent decay. The perforated pliofilm bags closed with a draw string kept the potatoes satisfactorily.

The weight loss in the various types of bags was similar to that in the first test. Packing potatoes in solid paper bags in a master container had no significant effect on weight loss. In the non-perforated polyethylene bags (No.s 5 and 8) weight loss was very low, but keeping quality was poor. Weight loss was also rather low in the tied top, perforated polyethylene bags of potatoes but slight decay developed in these when the tubers were packed wet or only partially dry. Weight loss was slightly greater in potatoes which were dried than in those packed wet or partially wet. There may be two explanations for this. The humidity in these bags was probably not as high as in the bags of wet potatoes and apparently the extra handling involved in drying resulted in more mechanical injuries which made the potatoes more subject to weight loss. Packing wet potatoes

TABLE 4.—*Condition and weight loss of Triumph potatoes of varying degrees of dryness in various types of packages held 7 days at 63°F. and 20 per cent relative humidity.*

TYPE OF BAG	Condition, When Packed at Dryness of Potatoes Indicated			Weight Loss, When Packed At Dryness Indicated		
	Wet	Partially Dry	Dry	Wet	Partially Dry	Dry
				Per cent	Per cent	Per cent
1. Solid paper	Satisfactory	Satisfactory	Satisfactory	1.8	1.8	2.3
1a. Solid paper in master container	Satisfactory	Satisfactory	Satisfactory	1.9	1.9	2.3
2. Paper with mesh windows	Satisfactory	Satisfactory	Satisfactory	1.9	1.9	2.3
3. Cotton mesh	Satisfactory	Satisfactory	Satisfactory	2.3	2.2	3.0
4. Paper mesh	Satisfactory	Satisfactory	Satisfactory	2.5	2.4	3.0
5. Elastic top polyethylene	Moisture condensation in bag. Mold and slight decay	Moisture condensation in bag. Mold and slight decay	Moisture condensation in bag. Mold and slight decay	0.3	0.3	0.4
6. Elastic top polyethylene, perforated	Satisfactory	Satisfactory	Satisfactory	1.6	1.6	2.2
8. Tied top polyethylene	Moisture condensation Severe decay	Moisture condensation Severe decay	Moisture condensation —moderate decay	0.1	0.1	0.1
9. Tied top polyethylene, perforated	Slight decay	Slight moisture condensation—slight decay	Satisfactory	0.5	0.9	0.7
10. Draw string pliofilm	———	Satisfactory	Satisfactory	....	1.1	1.4

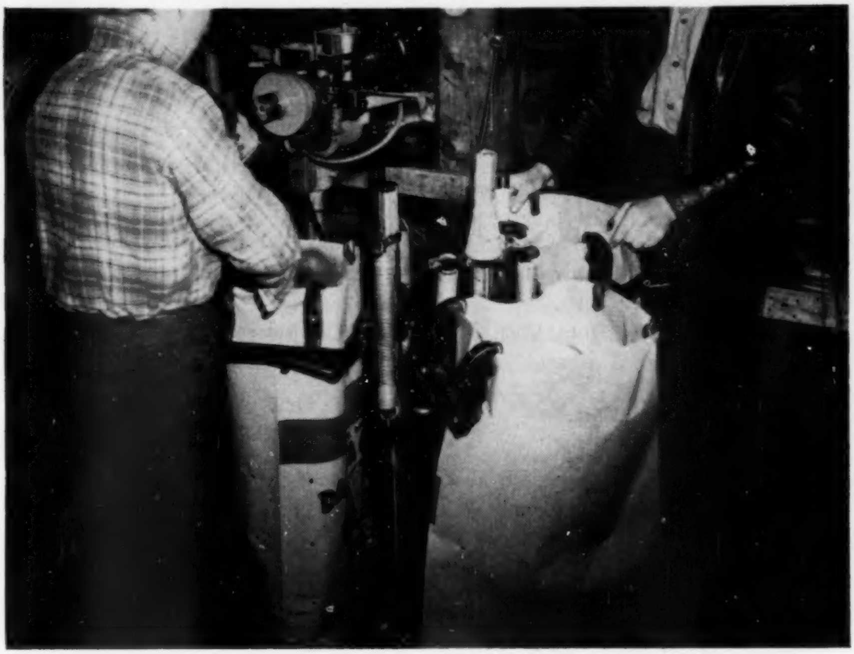

Figure 5.—Filling master containers.

Figure 6.—Loading cars with master containers.

in the various types of bags had no apparent adverse effect on the packages in this test.

Influence of Degree of Dryness and Waxing on Shipping Quality of Potatoes Packed in Various Types of Bags

The primary object of this experiment was to determine whether wet potatoes either with or without colored wax can be shipped in the various types of consumer bags.

A shipping test from East Grand Forks, Minnesota, to Chicago was made to compare 3 degrees of dryness and 1 wax treatment as follows:

1. Wet
2. Partially dry
3. Dry
4. Partially dry, waxed

Triumph potatoes of which about 85 per cent were U. S. No. 1 grade were used. A colored vegetable wax was applied at the rate of 1 gallon per 10,000 pounds with a foam waxer. Partial drying was accomplished by running the potatoes through a water eliminator and complete drying was accomplished by running them through a combination hot water and hot air drier.

The types of bags used in this test were as follows:

1. Solid paper
2. Paper with mesh window
3. Cotton mesh
4. Paper mesh
6. Elastic top polyethylene, perforated
10. Draw string pliofilm

Five bags of potatoes for each type of container and for each degree of dryness and waxing treatment were used. These were placed in master double wall paper bags, which in turn were loaded in a car containing 37,200 pounds of potatoes. This car was shipped to Chicago on March 24, 1950. The temperature in transit averaged 42°F. for the non-dried potatoes and 44° for those dried with the hot water and hot air drier. The potatoes were inspected on arrival after a 5-day transit period and again after holding for 1 week at 72° to 75°F.

There was no damage to the containers except in the case of the pliofilm bags in which there was some tearing. The manufacturer advised that FF pliofilm was used for these bags and that is not so strong as HP pliofilm, now in use. There was no staining of any of the bags on the outside due to colored wax, but red spots were noticeable inside the polyethylene and pliofilm bags where water condensed in droplets.

Shipping the potatoes wet produced no adverse effect on the consumer packages packed in master containers under the conditions of this test. It is suggested that any one contemplating using paper containers for wet

potatoes proceed upon a limited scale so as to determine how they stand up under a variety of actual transit conditions. A very slight amount of decay developed during the 1 week holding period at market, but this was not influenced by the type of bag, wetness of potatoes when packed, or waxing. On arrival in Chicago slight dampness of the potatoes was present in most bags that were packed with wet or partially wet potatoes in both the waxed and unwaxed lots. During the one week holding period, however, the dampness disappeared although the polyethylene and pliofilm bags tended to keep the potatoes packed wet or waxed slightly more moist and thus fresher in appearance. Although no mold or decay developed in this test as a result of the small amount of moisture present, this factor would have to be watched rather closely in commercial operations. Sprouting was not influenced by any of the treatments.

Summary

The amount of greening of potatoes was in proportion to the amount of visibility which the package permitted. Solid paper bags gave better protection against greening than any of the other packages.

Waxing with red colored wax masked somewhat, but did not prevent, greening of the tubers. The natural red color of the skin of red varieties also conceals greening unless it is severe. Cooking quality in both waxed and unwaxed potatoes was adversely affected by greening, particularly if severe and if the potatoes were boiled without peeling.

Weight loss during a one-week holding period in mesh bags was about 2.5 per cent. It was slightly less in solid paper bags.

The pliofilm bags used in this test were not suitable for potatoes because of their tendency to tear.

Stretch top polyethylene bags were satisfactory if perforated; if not perforated considerable moisture condensed in them and mold and decay developed. The tied top polyethylene bags permitted moisture condensation even when perforated unless the potatoes were dry when packed.

When potatoes in bags that permitted visibility were exposed to moderate amounts of light of approximately 25 foot candles for periods of 9 hours per day, greening was generally not serious until after 3 day's exposure.

Packing wet potatoes in several consumer types of bags had no apparent adverse effect on the packages or on the master containers either during holding or shipping in these experiments.

Colored wax added to potatoes, which were dried only with a water eliminator, did not stain the outside of paper bags but it left red spots on the inside of polyethylene and pliofilm bags where water had collected in droplets.

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ABSORPTION OF CO_2 BY LEAVES OF THE POTATO

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(Accepted for publication February 21, 1951)

Although the potato *(Solanum tuberosum, Linn.)* is one of the most important food crops of the world, no papers on photosynthesis by the plant have been located. Studies with several other crops have added to the knowledge of photosynthesis and have aided in understanding certain responses of these crops, or their varieties, to environmental variations. Nightingale and Blake (6) (7) pointed out the relation of several basic metabolic differences between certain apple and peach varieties to their climatic range of adaptation. A more complete understanding of metabolic differences between potato varieties and particularly between plant types, might be useful for the selection of superior seedling lines by potato breeders.

The objective of this study was to measure differences in apparent photosynthesis between leaves of several potato varieties and to determine the extent to which some environmental and internal factors influence the natural variation that occurs. Respiration always occurs simultaneously with photosynthesis and thus influences the rate of CO_2 absorption. For this reason the data are designated as CO_2 absorbed or the rate of apparent photosynthesis.

[1] The author is indebted to Dr. H. O. Werner for counsel in the planning and conduct of this investigation, and to Dr. Rufus Moore and Mr. Roscoe Abbott for assistance in building the apparatus and developing the procedures.

[2] Published with the authorization of the Director as Journal Paper No. 529 of the Nebraska Agricultural Experiment Station, Lincoln, Nebraska.

Methods

Triumph, Irish Cobbler, White Cloud and Progress single-stem plants spaced 2 ft. x 2 ft. were used for all determinations. The plants were grown under dryland conditions at the Box Butte Experiment Farm at Alliance, Nebraska during the summer of 1949. The land had been summer fallowed the previous year. The mean temperature was near average (70.1° F. in June, July and August) and no extended cloudy periods occurred. The total rainfall was 6.99 inches during June, July and August.

The apparatus used for measuring rate of CO_2 absorption was similar to that described by Heinicke and Hoffman (3) (4) and Verduin and Loomis (13) with several modifications. The apparatus and procedures were described in detail by Chapman (1). Six absorption units were operated simultaneously; two measuring the CO_2 content of normal air, and four measuring the CO_2 content of air drawn over enclosed potato leaflets. Smith (11) has shown that CO_2 absorption by leaves is a direct measure of carbohydrate synthesis and is free from errors of leaf shrinkage and carbohydrate translocation.

A cellophane box usually enclosed 3 or 5 potato leaflets which were removed and measured at the end of each day. Air was drawn through the cellophane box over the leaflets and the CO_2 remaining in the air was removed in the absorption towers. The check absorption train inlets were located between the rows at the same level as the tops of the plants to obtain air comparable with that entering the leaf chambers. The efficiency of absorption by the solution of KOH was nearly 100 per cent when normal butyl alcohol was added to the solution to reduce surface tension and a fritted glass disk was used to break the air stream into small bubbles. A unit of the apparatus is diagrammed in figure 1. The flowmeters were calibrated to pass 100 or 130 liters of air per hour as desired. Needle valves located in the manifold were used to regulate the air flow in each tower. The surge bottle prevented sudden changes in suction in the system.

Prior to each determination the suction pump was started and the flowmeters were adjusted to the calibration mark. A measured quantity of standard alkali was then let down into each tower, and the time recorded as the beginning of the test. The funnels were then rinsed with distilled water which was added to the absorption solution. During the test period, usually from one to two and one-half hours in duration, the flowmeters were carefully watched to maintain constant and equal airflow in each tower. At the end of each test a suction bypass valve in the surge bottle was opened to drain the alkali solution into flasks at the base of the towers. Distilled water was then used to rinse the towers. The absorbed CO_2 was precipitated with 10 ml. of 25 per cent $BaCl_2$ solution and the remaining alkali was titrated with standard HCl with phenolphthalein as indicator. The

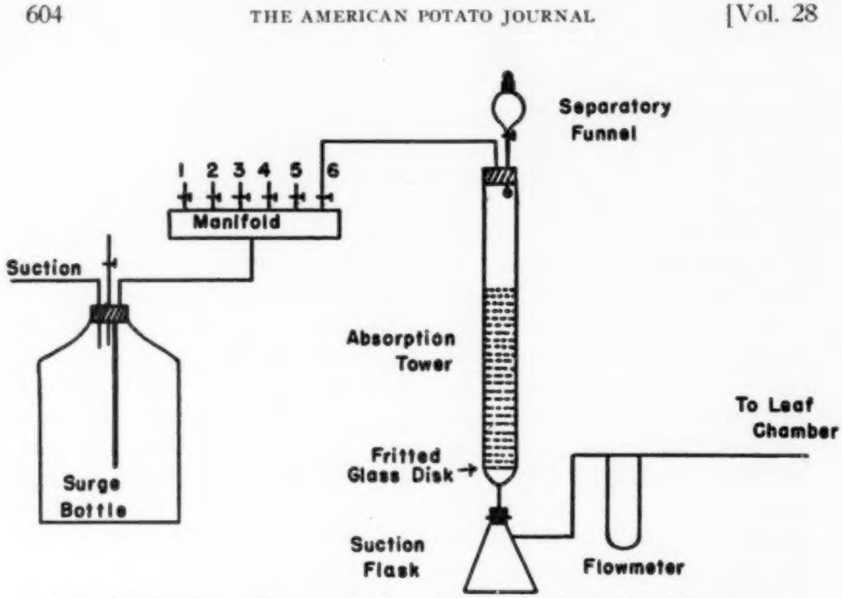

Figure 1—Diagram of the surge bottle and one absorption train of the apparatus.

quantity of CO_2 absorbed by the test leaflets was calculated from the titration differences between the air check and test towers.

Light intensity was measured with a Weston photometer and leaf chamber temperatures were determined by means of thermocouples. Readings were made once each hour or more frequently when conditions fluctuated. The thermocouples were shaded from direct sunlight by the enclosed leaflets. Observational notes of wilting were made at hourly intervals during midday.

External Factors Affecting CO_2 Absorption Air Supply

If CO_2 absorption under natural conditions is to be determined, approximately as much CO_2 must be available to the leaf as is normally present when it is freely exposed to the atmosphere. Thomas, Hendricks and Hill (12) and others have demonstrated that an equilibrium between photosynthesis and respiration in an unrenewed atmosphere will result when the CO_2 content of the air reaches approximately 40 ppm. Normal air contains about 330 ppm. It has also been demonstrated that the apparent photosynthesis of leaves will be increased, at least for short periods of time, by increasing the CO_2 content of the air.

Heinicke and his co-workers used two to two and one-half liters of air per square centimeter of leaf surface per hour as a minimum air supply. More recently, Verduin and Loomis (13) concluded that 1 liter of air

per square centimeter of leaf area per hour provided an adequate air supply. They reported CO_2 depletions of as much as 70 per cent and an average age depletion of 35 per cent in their work with maize.

In the studies reported here, a minimum airflow of 1 liter per square centimeter of leaf area per hour was used. The maximum CO_2 depletion encountered was 33 per cent (found by dividing the total mg. of CO_2 in the check determination into the mg. of CO_2 absorbed by the test leaflets x 100), whereas the mean depletion of all determinations was 16 per cent.

CO_2 Content of the Air

The generally accepted average content of CO_2 in air is .03 per cent by volume or .594 mg. per liter. Heinicke and Hoffman (4) found an average of .50 mg. of CO_2 per liter at Ithaca, New York. Verduin and Loomis (13) found a mean of .485 mg. of CO_2 per liter at Ames, Iowa.

The mean of 220 determinations made during the summer of 1949 at Alliance, Nebraska was .497 mg. of CO_2 per liter. Only a few readings, all of which were made during the night, approached the reported average of .594 mg. per liter (Table 1). A rapid decline in CO_2 content of the air was observed with the advent of photosynthesis in the early morning, which was followed by a rapid rise as light decreased and photosynthesis ceased in the evening. Marked fluctuations in the CO_2 content of the air occurred from day to day.

Soil Moisture and Wilting

Verduin and Loomis (13) reported apparently normal rates of CO_2 absorption by visibly wilted maize leaves within four hours after watering when compared with checks. Heinicke and Childers (2) and Schneider and Childers (9) found that a gradual drying of the soil was accompanied by an appreciable reduction in transpiration and photosynthesis in apple leaves. Pickett (8) and others found appreciable amounts of CO_2 absorbed by wilted leaves.

In this study a pronounced increase in the level of CO_2 absorption by potato leaves was observed following a rain of .90 inches on August 9, 1949, (Table 2). For several days prior to this rain, Triumph plants wilted during midday. Following the rain, air temperatures were lower and the plants were apparently fully turgid, both of which would favor high rates of CO_2 absorption.

Low rates of CO_2 absorption by badly wilted potato leaves were observed on numerous occasions (Table3). In fact CO_2 absorption continued even after large areas of leaf tissue had been killed. Unfavorable internal leaf conditions and reduced rates of CO_2 diffusion into the leaves due to stomatal closure may have caused the reduction in apparent photosynthesis.

TABLE 1.—*Reliability of check determinations and fluctuations in CO_2 content of the atmosphere at Alliance, Nebraska in 1949 under field conditions.*

Date	Time of Run	Mg. of CO_2 per Liter Check A	Check B	Difference Between Checks Mg.
Aug. 2	4:54- 5:54 a.m.	.5508	.5471	.0037
Aug. 2	6:10- 7:10 a.m.	.5338	.5271	.0067
Aug. 2	7:24- 8:24 a.m.	.4949	.5137	.0188
Aug. 2	8:37- 9:37 a.m.	.4834	.5016	.0182
Aug. 2	9:48-11:10 a.m.	.4807	.4834	.0027
Aug. 2	11:23-12:23 p.m.	.4749	.4797	.0048
Aug. 2	12:33- 1:33 p.m.	.4797	.4846	.0049
Aug. 2	1:44- 2:44 p.m.	.4883	.4931	.0048
Aug. 2	2:57- 3:57 p.m.	.4646	.4646	.0000
Aug. 2	4:07- 5:07 p.m.	.4713	.4682	.0031
Aug. 2	5:16- 6:16 p.m.	.4864	.4931	.0067
Aug. 2	6:28- 7:28 p.m.	.5204	.5110	.0094
Aug. 2	7:43- 8:31 p.m.	.5625	.5488	.0137
July 26	9:50-10:50 a.m.	.5274	.5226	.0048
Aug. 5	9:42-10:42 a.m.	.4798	.4883	.0085
Aug. 10	8:39-11:09 a.m.	.4805	.4727	.0078
Aug. 15	10:31-11:31 a.m.	.5124	.5061	.0063
Aug. 20	7:58-10:28 a.m.	.5046	.5230	.0184
Aug. 26	8:36-11:06 a.m.	.4822	.4875	.0053
Sept. 1	8:29-10:59 a.m.	.4784	.4941	.0157

TABLE 2.—*Mean CO_2 absorption by Triumph potato leaves on two days prior to and two days following a rain of .90 inches on August 9, 1949.**

Date	Tests Making up Mean	Mean Mg. of CO_2 Absorbed/ 100 cm^2/hr.
Aug. 6	4	4.3
Aug. 8	8	5.4
Aug. 9	.90 in. of Precipitation	
Aug. 10	6	10.2
Aug. 11	6	18.5

* Different leaves of approximately the same age were used on each date.

TABLE 3.—*Representative examples of CO_2 absorption by visibly wilted and turgid Triumph potato leaves.*

Date	Wilted Leaves				Turgid Leaves		
	Time of Run	Degree of Wilting*	Temp. in Leaf Chamber	Mg. CO_2/100 CM^2/Hr.	Time of Run	Temp. in Leaf Chamber	Mg. CO_2/100 CM^2/Hr.
July 18	3:26- 4:16	5	102	17.4	3:26- 4:16	102	23.3
July 26	12:14- 1:14	7	111	15.8	9:50-10:50	102	25.0
Aug. 5	1:21- 2:21	9	111	12.1	8:32- 9:32	88	17.0
Aug. 8	8:47-11:32	7	108	9.1	No		
Aug. 8	1:45- 4:45	9	111	4.3	comparable		
Aug. 13	11:18- 1:48	6	106	16.9	data		

* O to 10 basis — O turgid leaf, 10 completely limp leaf with some portions of tissue probably killed.

LIGHT INTENSITY

Heinicke and Hoffman (4) and Verduin and Loomis (13) found that light intensities of 2500 and 3000 foot candles were necessary for maximum photosynthesis in apple and maize leaves. Meyer and Anderson (5) stated that photosynthesis was approximately proportional to the light intensity up to the point some other factor may become limiting. They concluded that maximum photosynthesis per unit area of leaf was attained in probably all species at light intensities much less than that of full sunlight.

A group of determinations arranged in classes (Table 4) indicate that light intensities below 2000 foot candles apparently may limit CO_2 absorption by Triumph potato leaves. The data were collected from leaves that had been shaded from the full sunlight and temperatures in the leaf chambers were below 95° F. The intensity of full sunlight at Alliance in the summer is well over 10,000 f.c. except in the early morning or late afternoon.

TEMPERATURE

Meyer and Anderson (5) pointed out that the rate of photosynthesis at any given temperature depended not only on the temperature, but also on the length of time that the plant had already been at that temperature, due to the progressively limiting effect of some internal factor generally called the "time factor". They stated that optimum temperature can be defined only with reference to time and can be considered as the highest

TABLE 4.—*Mean milligrams of CO_2 absorbed per 100 cm^2 of leaf surface per hour by Triumph potato leaves within various light intensity ranges with leaf chamber temperatures between 60° and 95° F.*

Light Intensity in f.c.*	No. of Readings Included in the Mean	Mean Mg. of CO_2 Absorbed /100 Cm^2/Hr.
Under 1000	4	5.1
1001 to 1500	4	8.4
1501 to 2000	21	8.5
2001 to 2500	16	12.2
2501 to 3000	14	13.0
3001 to 3500	6	13.3
3501 to 4000	8	13.5
4001 and over**	11	18.9

* Cheesecloth shades or clouds prevented full sunlight intensities.
** Eight of these readings were over 5000 f.c.

temperature at which the initial rate of photosynthesis is maintained for a relatively long period. In this sense, optimum temperature varies considerably with different species being higher in those species native to tropical zones. Verduin and Loomis (13) found no correlation between temperature and CO_2 absorption by maize leaves under field conditions.

The mean rate of CO_2 absorption by potato leaves was highest between 80° and 90° F. (Table 5). In general, the data are comparable, but various factors which cannot be fully controlled, particularly under natural conditions, may have influenced the results. For example, most of the low temperature readings were obtained during the early morning hours when CO_2 absorption is usually near the maximum rate. Soil moisture conditions were not controlled during the tests.

INTERNAL FACTORS AFFECTING CO_2 ABSORPTION

PAIRED LEAF VARIATIONS

Verduin and Loomis (13) reported variations of as much as 90 per cent with apparently paired maize leaves under nearly identical conditions. Variations of 10 to 30 per cent were common and an average of 25 per cent was found. They reported that Maximov found paired tests varying as much as 139 per cent under apparently identical conditions. Heinicke and Hoffman (4) reported similar variations.

In the studies reported here, four Triumph leaves were tested simultaneously under field conditions. The 3rd and 4th leaves below the terminal

TABLE 5.—*Mean milligrams of CO_2 absorbed per 100 cm^2 of leaf surface per hour by Triumph potato leaves within various temperature ranges with light intensities of over 2000 f.c.*

Temperature Range in Degrees F.	Tests Making up Mean	Mean Mg. of CO_2 Absorbed /100 Cm^2/Hr.
65-80	49	14.7
80-90	80	16.1
90-100	34	15.3
over 100	31	10.1

leaf cluster on two equally vigorous plants were selected for each determination. Conditions were maintained as nearly identical as possible in all four leaf chambers. Variations were nearly as large between the 3rd and 4th leaves on the same plant as between paired leaves on different plants (Table 6). The F values for between tests and between leaves in the analysis of variance were highly significant.

DIFFERENCES DUE TO LEAF AGE

Singh and Lal (10) reported that as plants became older a gradual rise in the rate of CO_2 absorption of all leaves occurred, followed by a decrease with the advent of senescence. They studied leaves of three ages from the same plant throughout the life of the plant. At any particular time the older leaves were found to absorb CO_2 at a slower rate than leaves which were younger. They worked with flax, wheat and sugar cane in India.

In this work a series of tests were made with young and old leaves on the same plant. The 3rd or 4th leaf below the terminal leaf cluster was selected as the young leaf, while the 10th to 12th leaf was selected as the older leaf. The dryland plants were relatively small and erect with usually 12 to 15 leaves on the main stem. The young and old leaves were exposed to approximately equal light intensities and the assimilation chambers containing the test leaflets were fastened in a horizontal plane. With both Irish Cobbler and Triumph, the older leaves were only 66 per cent as efficient in CO_2 absorption per unit area as the young leaves (Table 7). A similar but less pronounced trend is shown in table 6; the 4th leaf below the terminal cluster being only 92 per cent as efficient in CO_2 absorption as the 3rd leaf.

DIURNAL CYCLE

Meyer and Anderson (5) presented a discussion of the daily march of photosynthesis. They reviewed the work of Kostychev, who found that a peak was reached during the mid-morning hours with small plants or

TABLE 6.—*Variations in the rate of CO_2 absorption by paired leaves on the same plant and on different Triumph plants.*

		Mg. of CO_2/100 cm^2 of Leaf Surface per Hour							
		Plant I			Plant II				
Date	Time of Run	3rd Leaf	4th Leaf	Ratio 3rd Leaf to 4th*	3rd Leaf	4th Leaf	Ratio 3rd Leaf to 4th*	Ratio Plant I to II 3rd Leaf	Ratio Plant I to II 4th Leaf
Aug. 15	8:02- 9:02	15.2	15.5	.98	17.2	12.9	1.33	.88	1.20
"	9:14-10:14	13.1	11.6	1.13	19.7	11.6	1.70	.66	1.00
"	10:31-11:31	14.8	17.9	.83	22.8	17.9	1.27	.65	1.00
"	12:22- 1:22	16.8	21.5	.78	26.0	23.4	1.11	.65	.92
"	1:31- 2:31	19.9	17.7	1.12	26.1	25.9	1.01	.76	.68
"	2:42- 3:42	15.9	8.2	1.94	17.8	16.6	1.07	.89	.49
"	3:52- 4:52	19.7	15.4	1.28	16.1	16.2	.99	1.22	.95
Aug. 17	8:30-11:00	16.1	15.5	1.04	19.0	14.6	1.30	.85	1.06
"	11:11- 1:46	18.9	17.4	1.09	25.6	20.0	1.28	.74	.87
"	1:56- 4:26	7.5	12.5	.60	13.6	10.8	1.26	.55	1.16
Aug. 18	8:05-10:35	22.6	26.9	.84	23.2	17.3	1.34	.97	1.55
"	10:50- 1:20	22.6	26.7	.85	23.7	18.7	1.27	.95	1.43
"	1:33- 4:03	10.8	17.1	.63	16.8	12.2	1.38	.64	1.40
Aug. 19	9:56-12:56	18.4	15.6	1.18	17.7	16.7	1.06	1.04	.93
"	1:07- 4:07	15.4	10.4	1.48	12.5	20.6	.61	1.23	.50
"	4:18- 5:18	9.4	6.2	1.52	......	......	......	......	......
Aug. 20	7:58-10:28	16.7	9.8	1.70	15.9	14.8	1.07	1.05	.66
"	10:40- 1:10	14.1	13.8	1.02	18.0	18.2	.99	.78	.76
Mean		16.0	15.5	1.11	19.5	17.0	1.17		
Mean of Plants I and II.					17.7	16.2			

* Absorption rate of the 3rd leaf divided by the absorption rate of the 4th leaf.

Analysis of Variance

Source of Variation	D.F.	Sums of Squares	Mean Square
Total	71	1782.24	
Between tests	35	1275.35	36.44**
Between leaves	1	28.75	28.75**
Error	35	478.14	13.66

**L.S.D. between two leaf means at the 1 per cent level — 2.4.

single leaves which was sometimes followed by a midday decline and a secondary maximum later in the afternoon. They explained this type of curve as being due to a temporary limiting effect of certain internal factors such as the accumulation of the products of photosynthesis or a temporary midday closure of the stomates.

In this study a rapid increase of apparent photosynthesis occurred with all four varieties as light intensities increased in the early morning hours and a maximum for most days was reached between 7:00 and 9:00 a.m. (Figure 2). This peak was followed by a gradual decline in CO_2 absorption

TABLE 7.—*Comparison of the rate of CO_2 absorption by the 10th to 12th leaf (old) below the terminal leaf cluster and the 3rd or 4th leaf (young) below the terminal leaf cluster in Triumph and Irish Cobbler potatoes.*

		Mg. CO_2/100 Cm^2 Leaf Surface/Hour					
		Triumph Plant I		Triumph Plant II		Irish Cobbler	
Date	Time of Run	Old	Young	Old	Young	Old	Young
Aug. 6	9:45-12:08	1.5	11.9	1.3	2.5		
Aug. 8	8:47-11:32	8.1	7.5	2.1	9.1		
"	1:45- 4:45	4.8	1.8	4.9	4.3		
Aug. 10	8:39-11:09	.2	17.7			16.9	23.8
"	11:23- 1:53	5.2	20.2			18.1	31.1
"	2:08- 4:38	1.6	16.1			16.1	32.2
Aug. 11	8:57-11:27	17.0	22.3			19.9	22.1
"	11:41- 2:11	16.8	21.1			25.8	23.5
"	2:28- 4:58	15.6	18.5			13.9	17.9
Aug. 12	8:37-11:07	4.7	10.6			6.8	14.5
"	11:20- 1:50	4.7	12.3			8.1	17.8
Aug. 13	8:31-11:01	12.5	13.7			12.9	23.8
"	11:18- 1:48	16.9	13.6			16.0	18.9
Aug. 22	8:38-11:08	9.8	26.9	7.4	9.6		
"	11:25- 1:55	6.9	12.9	3.3	10.5		
"	2:13- 4:43	5.2	9.0	5.0	6.2		
Aug. 23	8:13-10:51	10.8	22.9	10.5	11.8		
"	11:30- 2:00	4.2	9.4	3.3	6.8		
Aug. 24	10:54- 1:24	21.6	21.2	8.1	14.4		
"	1:36- 4:06	15.8	14.3	6.4	14.4		
Aug. 25	8:14-10:44	15.4	12.6	6.0	11.6		
"	11:36- 2:06	11.4	10.3	—1.2	7.7		
"	2:17- 4:47	9.0	10.0	2.1	7.7		
Aug. 26	8:36-11:06	7.9	17.8	10.5	1.8		
"	11:21- 1:51	11.9	24.0	17.7	9.8		
"	2:04- 4:37	10.2	17.2	8.5	7.9		
Aug. 27	8:40-11:13	13.1	30.8	15.8	13.5		
Aug. 30	7:55-10:25	18.6	16.9	15.3	28.4		
"	10:38- 1:12	12.7	13.8	9.7	22.3		
"	1:39- 4:09	10.8	8.9	7.9	15.6		
Aug. 31	8:17-10:47	15.4	17.7	14.1	21.6		
Sept. 1	8:29-10:59	13.1	18.0	10.4	15.3		
"	11:12- 1:42	10.8	14.4	10.8	17.6		
"	2:00- 4:30	5.8	13.0	6.6	12.9		
Mean ——		10.3	15.6	7.8	11.8	15.4	22.6
Mean of Plants I and II				9.3	14.0		

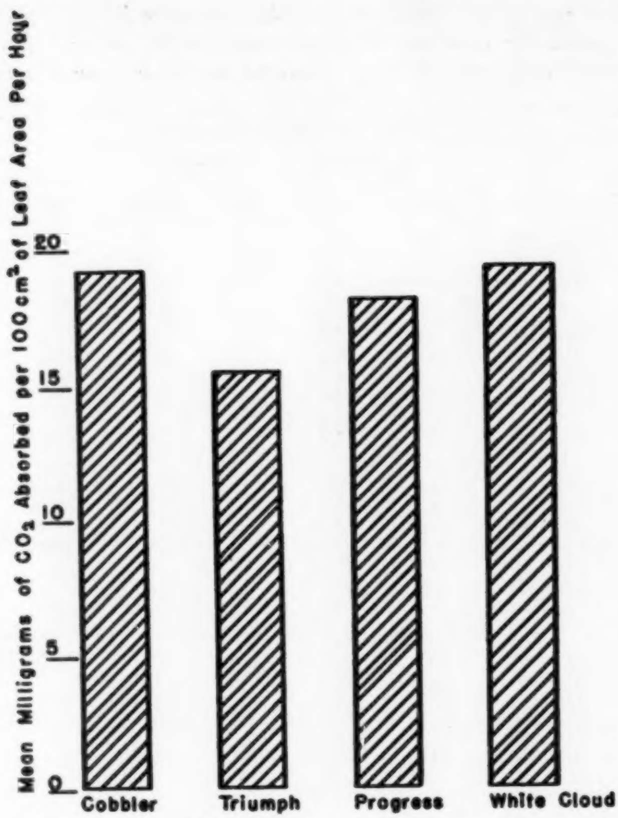

Figure 2—Diurnal curve of CO_2 absorption by single leaves of four potato varieties on July 26, 1949 at Alliance, Nebraska.

during the day until about 4:30 p.m., at which time a rapid decrease occurred as light intensity diminished in the late afternoon. With certain varieties on some days, a secondary peak of apparent photosynthesis occurred during the afternoon, but results were inconsistent in this respect. The data shown in figure 2 are reasonably typical of the trends observed with these varieties on other days.

Varietal Difference in CO_2 Absorption

A few preliminary determinations of the rate of CO_2 absorption by leaves of different varieties showed that large variations occur from hour to hour and from day to day within the same variety. However, varietal differences did occur, for when 71 comparable sets of data involving 16

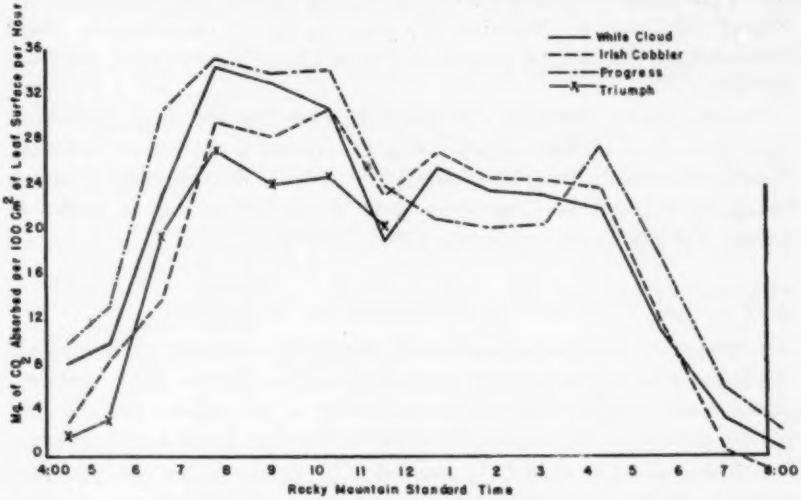

Figure 3—Mean rate of CO_2 absorption by leaves of four potato varieties at Alliance, Nebraska.

pairs of Triumph and Irish Cobbler leaves were grouped; the mean apparent rates of assimilation were 13.13 and 16.62 mg. of CO_2 per 100 cm^2 of leaf area per hour respectively. Statistical analysis of the data, which is graphed in figure 3, indicated that Triumph was significantly lower in CO_2 absorption per unit area than the other three varieties. In view of the effect of leaf turgidity on photosynthesis, the low value of Triumph is undoubtedly associated with its tendency to wilt readily and for long periods.

Discussion

The CO_2 absorption method of measuring photosynthesis is well adapted to the study of potato leaves. It has the advantages over other methods of eliminating translocation errors and permitting use of the same leaf segment in successive experiments. The principal difficulties encountered were the accurate metering of air through the several absorption trains and prevention of excessive temperature build up in the leaf chambers from solar radiation.

The high CO_2 absorption values recorded after effective rains were probably due to both greater leaf hydration and more favorable temperatures that prevailed following these rains. On the other hand wilting, which generally occurred when temperatures were excessively high, was reflected in lower rates of CO_2 absorption.

The wide range in rate of CO_2 absorption by apparently paired leaves

can be attributed to certain poorly understood internal leaf conditions. No attempt was made to determine the exact nature of these factors which influenced the rate of CO_2 absorption not only from hour to hour, but from day to day.

Triumph plants generally wilt more frequently and for longer periods of time than Irish Cobbler plants when temperatures are above optimum. Possibly this results in a lower mean rate of CO_2 absorption by Triumph leaves and may partially explain why the Irish Cobbler can be grown in regions of higher mean temperature than Triumph.

Summary

1. The CO_2 absorption method of measuring apparent photosynthesis was found to be well adapted to use with potato leaves. The major problems encountered were the accurate measurement of air volume in each unit and the prevention of excessive temperature build-up in the leaf chambers.

2. The general level of CO_2 absorption by potato leaves was increased following effective rains.

3. Wilting of leaves caused a decrease in the rate of CO_2 absorption.

4. Maximum assimilation rates of Triumph leaves were found between the temperatures of 80 and 90° F. under field conditions.

5. Highest assimilation rates were usually recorded between 8:00 and 10:00 a.m., followed by a gradual decline throughout the remainder of the day.

6. Large natural variations in rate of CO_2 absorption were found with paired leaves on the same and different potato plants.

7. Leaves located near the base of potato plants were found to absorb CO_2 only two-thirds as rapidly as the 3rd or 4th leaves below the terminal leaf cluster.

8. In comparable tests with four varieties, Triumph had the lowest rate of CO_2 absorption per unit area of leaf surface.

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Michigan Potato Growers Exchange, Inc., 116 W. Harris St., Cadillac, Mich. Publishers of "Michigan Potato Growers News."

Minnesota Potato Improvement Association, University Farm, St. Paul 1, Minnesota. Secretary-Treasurer, A. G. Tolaas, University Farm, St. Paul 1, Minn.

Red River Valley Potato Growers Association, Box 301, East Grand Forks, Minn. Publishers of "The Valley Potato Grower." President, Sam Fedje, Hoople, N. Dak.; Vice-President, Eugene Peterson, Baker, Minn.; Secretary, Ross Tallackson, Grafton, N. Dak.; Treasurer, John Scott, Gilby, N. Dak.; Executive Secretary, W. M. Case, East Grand Forks, Minn.

Southern Minnesota Vegetable Growers Association, Albert Lea, Minn. President, Joe Boe, Hollandale, Minn.; Vice-President, Willis Reyeen, Hollandale; Secretary-Treasurer, Juel B. Nelson, Albert Lea.

Nebraska Certified Potato Growers Non-Stock Cooperative Association, 202 Laramie, Alliance, Nebraska. President, W. T. Young, Pine Bluffs, Wyo.; Vice-President, Charles Barbour, Scotts Bluff, Neb.; Treasurer, H. S. Keane, Hemingford, Neb.; Secretary and Sales Manager, W. G. Petersen, Alliance; General Manager, Howard McLean, Scotts Bluff.

Potato Development Division, Box 277, Scotts Bluff, Neb. Publishers of "Mail Bag." Chairman, R. M. Howard, Dept. of Agriculture, Lincoln 9, Neb.; Chief, Earl P. Barrios, Scotts Bluff.

New Hampshire Potato Growers Ass'n, Wilton, N. H. President, Herbert V. Mayberry, Lancaster, N. H.; Vice-President, Harold S. Nightingale, 22 Franklin St., Concord, N. H.; Secretary-Treasurer, Daniel R. Batchelder, Wilton.

New Jersey State Potato Association, Rutgers University, New Brunswick, N. J. Publishers of "Hints to Potato Growers." President, Charles Holman, Dutch Neck, N. J.; Vice-President, David Jones, Wrightstown, N. J.; Secretary, John Campbell, New Brunswick; Corresponding Secretary, W. H. Martin, New Brunswick; Treasurer, Fred Brunner, Jr., Cranbury, N. J.

Potato Industry Committee of the New Jersey State Potato Association, 143 East State St., Trenton. Executive Secretary, John M. Fenton.

Adirondack Potato Growers Cooperative Ass'n, Inc., Burke, N. Y. President, Albert Seymore, Malone, N. Y.; Vice-President, Justin Wescott, Lake Placid, N. Y.; Secretary-Treasurer, George McCoy, Burke.

Empire State Potato Club, Inc., Cornell University, Ithaca, N. Y. Publishers of "Potato News." President, Harold J. Evans, Georgetown, N. Y.

New York Certified Seed Growers' Co-operative, Inc., 315 Plant Science Bldg., College of Agriculture, Ithaca, N. Y. President, Bruce P. Jones, Hall, N. Y.; Secretary-Treasurer, Josephine M. Gonzenbach, Ithaca.

New York Co-operative Seed Potato Association, Georgetown, N. Y. Publishers of "Potato Patter." Secretary-Treasurer, Harold J. Evans, Georgetown.

North Carolina Potato Association, P. O. Box 2281, Raleigh, N. C. President, T. C. Sawyer, Belcross, N. C.; Vice-President, Nelson Hicks, Mt. Olive, N. C.; Secretary-Treasurer, John A. Winfield, P. O. Box 2281, Raleigh.

(Continued on Page 9)

Ohio Vegetable and Potato Growers Association, Room 210, Horticulture Bldg., Ohio State University, Columbus 10, Ohio. Publishers of "Annual Proceedings." President, Andrew Rosbough, Berea, Ohio; Secretary, Victor E. Keirns, Room 210, Horticulture Bldg., Ohio State University; Treasurer, Christian Babbert, 3176 S. High St., Columbus; Associate Secretary, E. C. Wittmeyer, O. S. U. Horticulture Bldg., Columbus.

Ohio Potato Growers Association, 3280 North High St., Columbus 2, Ohio. President, Carroll Bartter, Columbia Station, Ohio; Vice-President, Gerald Studebaker, New Carlisle 3, Ohio; Secretary-Treasurer, O. A. Brookhart, 3280 North High St., Columbus 2.

Oregon Potato Commission, 632 Sixth St., Redmond, Ore. Chairman, Scott Warren, Rt. 3, Box 1230, Klamath Falls, Ore.; Vice-Chairman, N. L. Weigand, Powell Butte, Ore.; Secretary and Administrator, Ben Davidson, 249 Sixth St., Redmond.

Central Oregon Potato Growers Association, 632 Sixth St., Redmond, Oregon. President, Roe Holly, Rt. 1, Bend, Ore.; Vice-President, Franklin Nolan, Redmond; Executive Secretary, Ben Davidson, Redmond.

Pennsylvania Cooperative Potato Growers', Inc., 1100 North 7th St., Allentown, Penna. Publishers of "The Guide Post." President, Hugh C. McPherson, R.D. 1, Bridgeton, Pa.; Vice-President, Ivan Miller, Corry, Pa.; 2nd Vice-President, Perry Knorr, Catawissa, Pa.; 3rd Vice-President, Roy T. Wotring, Sr., Schnecksville, Pa.; Secretary, Charles W. York, 1100 N. 7th St., Allentown; General Manager and Treasurer, S. S. Westrick, 1100 N. 7th St., Allentown.

South Dakota Potato Growers Association, Box 671, Watertown, S. Dak. President, E. A. Fletcher, Garden City, S. Dak.; Vice-President, Charles A. Larkin, Clark, S. Dak.; Secretary, John Noonan, Watertown; Treasurer, Arthur Frank, Clark.

Puite County Potato Growers Association, Circleville, Puite County, Utah. President, George Westwood, Circleville; Vice-President, Garald Horten, Circleville; Sales Manager, Rex G. Thompson, Circleville; Secretary and Treasurer, Alma Morgan, Circleville.

Utah Crop Improvement Association, Utah Agricultural Experiment Station, Logan, Utah. President, George F. Stallings, Eden, Utah; Vice-President, David Holmgren, Tremonton, Utah; Secretary-Treasurer, Golden L. Stoker, Logan.

Vermont Certified Seed Potato Growers Association, Vermont Dept. of Agriculture, Montpelier, Vt. President, Cyrus E. Cramton, Castleton, Vt.; Vice-President, Carleton J. Batten, East Hardwick, Vt.; Secretary-Treasurer, Harold L. Bailey, Vermont Dept. of Agriculture, Montpelier; Assistant Secretary-Treasurer, Rosemary T. Sullivan, Montpelier.

Association of Virginia Potato and Vegetable Growers, Inc., P. O. Box 2160, Norfolk 1, Va. President, B. M. Wood, Fentress, Va.; First Vice-President, A. Preston Scott, R.F.D. Cape Charles, Va.; 2nd Vice-President, O. H. Wilkerson, New Church, Va.; Secretary, G. M. Whitehurst, Oceana, Va.; Treasurer, B. W. Shelton, Jr., Route 1, Norfolk; Executive Secretary, E. W. Cake, P. O. Box 2160, Norfolk 1.

Washington Certified Potato Growers Association, c/o Alfred Brandt, Rt. 3, Lynden, Wash. President, Alfred Brandt, Route 3, Lynden; Vice-President, Clarence Erdman, 1256 Aldrich Road, Bellingham, Wash.; Secretary-Treasurer, Everett Loreen, Route 3, Box 159, Lynden.

West Virginia Potato Growers Association, Oglebay Hall, Morgantown, West Va. President, Fred Stemple, Aurora, West Va.; Vice-President, Russell Linger, Millcreek, W. Va.; Secretary, Claude R. Kemper, Oglebay Hall, Morgantown; Treasurer, Charles Kittle, Valley Bend, W. Va.

Potato Growers of Wisconsin, Inc., Suite 15, Fidelity Bank Bldg., Antigo, Wisc. Publishers of "The Badger Common 'Tater." President, James Swan, Jr., Delavan, Wisc.; Vice-President, Melvin Luther, Elcho, Wisc.; Secretary-Treasurer, W. J. Prosser, Antigo; Executive Secretary, Roger Stake, Antigo.

Wyoming Crop Improvement Association, College of Agriculture, University of Wyoming, Laramie, Wyoming. Dr. W. A. Reidl, Charge Seed Certification, Univ. of Wyoming.

PERSONS AND AGENCIES IN CHARGE OF SEED CERTIFICATION IN VARIOUS STATES

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H. W. Poulsen, Chief and B. F. Branstetter, Supervising Inspector, Bureau of Fruit and Veg. Standardization, Dept. of Agr., Sacramento 14, Calif.

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Karl H. Fernow, Plant Pathologist, New York Certified Seed Growers' Cooperative, Inc., cooperating with N. Y. State Dept. of Agr. and Markets and N. Y. State College of Agr., Ithaca, New York.

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C. F. Campbell, Chief Entomologist, Bureau of Plant Industry, Dept. of Agr., Harrisburg, Pa.

South Dakota

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L. T. Richardson, Assoc. Plant Pathologist, Chief Field Inspector, South Dakota State College, Brookings, S. D.

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Texas

R. V. Miller, Chief, Seed Divisions, State Dept. of Agr., Austin, Texas.

Utah

G. L. Stoker, Secretary-Treasurer, Utah Crop Improvement Ass'n. in cooperation with Utah State Exp. Sta., Logan, Utah.

Vermont

H. L. Bailey, Director, Division Plant Pest Control, Dept. of Agr., Montpelier, Vt.

Virginia

S. F. Grubbs, Secretary, Virginia Crop Improvement Ass'n, Inc., Blacksburg, Va.

Washington

Lewis W. King, State Potato Specialist, State Dept. of Agr., Bellingham, Wash.

Wisconsin

H. M. Darling, In Charge, Seed Certification, Dept. of Plant Pathology, College of Agr., Madison 6, Wis.

Wyoming

Wm. A. Riedl, Agronomist, College of Agr., in cooperation with Wyoming Crop Improvement Ass'n, Laramie, Wyo.

POTATO CULTURE IN THE UNITED STATES

A LIST OF RECENT REFERENCES

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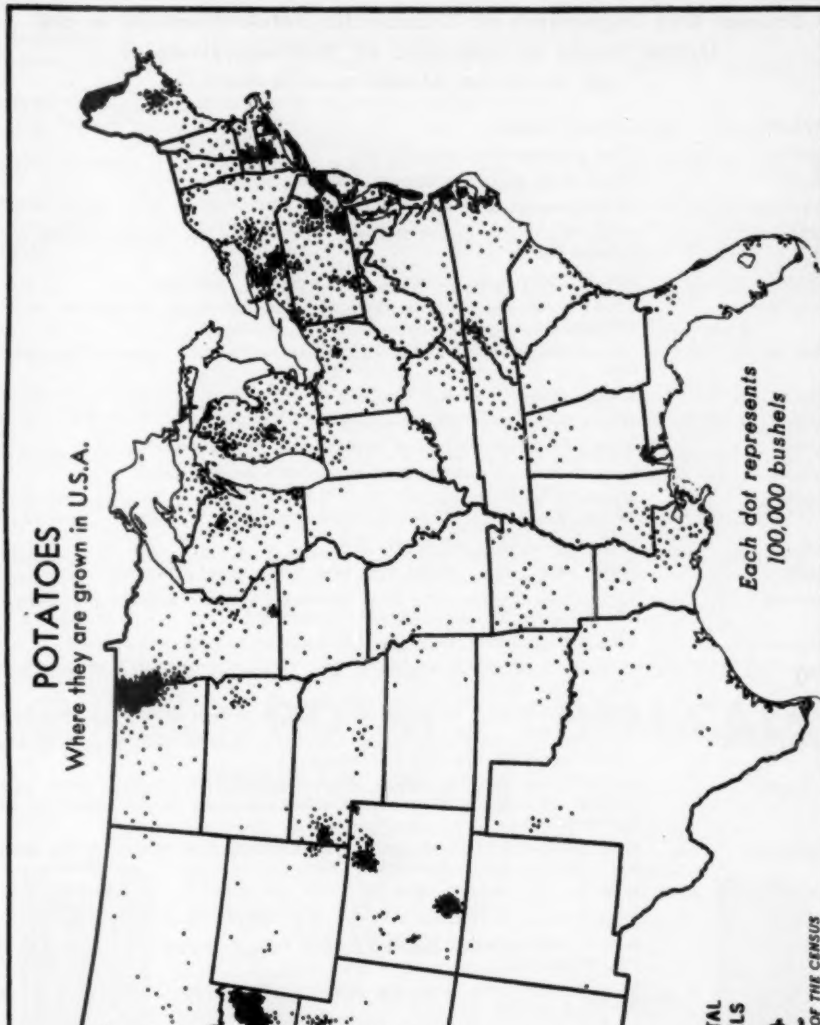
POTATOES FOR LIVESTOCK FEED

According to C. R. Allender, Agricultural Economist in Washington, D. C., about 50 million bushels of potatoes grown each year in the United States should be classed as culls unfit for human consumption; according to him such potatoes can be used to replace approximately ½ of the hay or all of the ensilage or a small portion of the digestible nutrients in grain for livestock. For all livestock except swine the best results can be obtained by feeding potatoes in the fresh form. Cooking improves their palatability and digestibility for swine. Sun-burned and green tubers should not be used.

Silage should be made by adding 20% or more of dry hay to increase palatability and to reduce loss of soluble nutrients. To reduce silo failure from excessive weight, do not fill silos more than two-thirds full.

Trench silos from 10 to 12 feet wide and of approximately the same depth, usually excavated on a gentle slope (for drainage), can be used. Drainage must be provided on level sites. The walls may be nearly vertical to 45 degrees of slope, depending upon the type of soil. Ensilage may be packed by driving livestock through the trench or by driving a caterpillar tractor over it. A layer of straw and dirt from six to 12 inches deep will form an effective seal and cover. Feeding should take place from the end, being careful to uncover small portions as needed.



U.S. DEPARTMENT OF AGRICULTURE NEG. 46360 BUREAU OF AGRICULTURAL ECONOMICS

Present Day Importance of Commercial Potato Varieties in the United States as Estimated by Representatives of the 48 States, Alaska and Hawaii

STATE	VARIETIES
Alabama[1]	Bliss Triumph 70%; Sebago 30%
Arizona[1]	White Rose, Bliss Triumph, Red Warba
Arkansas	Bliss Triumph 90%; Irish Cobbler 10%
California	White Rose 90%; Russet Burbank 5%; Calrose 2%; Bliss Triumph 2%; Pontiac 1%
Colorado	Red McClure, Bliss Triumph, Irish Cobbler, Katahdin
Connecticut[1]	Green Mountain 40%; Katahdin 40%; Irish Cobbler, Chippewa, Rural, Sebago 20%
Delaware	Irish Cobbler 60%; Katahdin 20%; Dakota Red 5%; Sequoia 3%; others 12%
Florida[1]	Sebago, Bliss Triumph, Katahdin
Georgia	Irish Cobbler 60%; Bliss Triumph 30%; others 10%
Idaho[1]	Russet Burbank 95%; Bliss Triumph and White Rose 5%
Illinois[1]	Irish Cobbler, Katahdin, Sebago, Red Warba, Chippewa
Indiana	Katahdin 40%; Chippewa 25%; Irish Cobbler 25%; Bliss Triumph, Sebago, Early Ohio, Warba, Sequoia 10%
Iowa	Irish Cobbler 85%; all others 15%
Kansas	Irish Cobbler 50%; Warba 10%; Red Warba 35%; others 5%
Kentucky	Early: Irish Cobbler 95%; Bliss Triumph 5%. Late: Sequoia 60%; Sebago 5%; Katahdin 5%; Irish Cobbler (seed) 30%
Louisiana[1]	Bliss Triumph 85%; Katahdin 5%; LaSoda, LaSalle, DeSota 10%
Maine	Katahdin 52%; Green Mountain 25%; Chippewa 17%; Irish Cobbler 2%; Sebago 2%; others 2%
Maryland	Irish Cobbler 50%; Katahdin 25%; Sebago 10%; Pontiac 10%; others 5%
Massachusetts	Katahdin 50%; Green Mountain 20%; Irish Cobbler 15%; Chippewa 6%; Russet Rural 4%; Sebago 3%; others 2%
Michigan	Russet Rural 45%; Chippewa 15%; Katahdin 15%; Sebago 10%; Irish Cobbler 5%; Green Mountain, Pontiac, Sequoia, White Rural, Russet Burbank 10%
Minnesota[1]	Irish Cobbler, Bliss Triumph, Russet Burbank, Red Warba, White Rose, Early Ohio, Pontiac, Sebago, others
Mississippi	Bliss Triumph 95%; others 5%
Missouri	Irish Cobbler 75%; Bliss Triumph 15%; Warba 5%; others 5%
Montana	Netted Gem (Russet Burbank) 60%; Bliss Triumph 30%; White Rose 5%; others 5%
Nebraska	Bliss Triumph 75%; Progress 15%; Red Warba 8%; Pontiac, Katahdin, Russet Rural 2%
Nevada	Nevada Russet
New Hampshire[1]	Green Mountain 40%; Katahdin 25%; Houma 15%; Chippewa 10%; Sebago, Irish Cobbler and others 10%
New Jersey	Katahdin 65%; Irish Cobbler 20%; Chippewa 10%; Green Mountain 2%; Mohawk 1%; Pawnee, Sebago, others 2%
New Mexico	Pontiac 70%; White Rose 15%; Irish Cobbler 10%; Katahdin 5%
New York	Katahdin 35%; Green Mountain 20%; Sebago 10%; Irish Cobbler 10%; Chippewa 5%; Russet Rural 5%; Pontiac 5%; Ontario 5%; Rural and Houma 5%
North Carolina[1]	Irish Cobbler, Sequoia
North Dakota	Bliss Triumph 35%; Red Pontiac and Pontiac 30%; Irish Cobbler 25%; others 10%

(Continued on Page 25)

Ohio	Irish Cobbler 45%; Katahdin 45%; Sebago, Russet Rural, Chippewa, Pontiac 10%
Oklahoma[1]	Bliss Triumph, Red Warba, Irish Cobbler
Oregon[1]	Netted Gem (Russet Burbank) 74%; White Rose 12%; Burbank 8%; Bliss Triumph 5%; others 1%
Pennsylvania[1]	Katahdin, Russet Rural, Teton, Sebago
Rhode Island[1]	Green Mountain 40%; Irish Cobbler 20%; Katahdin 20%; Chippewa, Sebago and others 20%
South Carolina	Sebago 70%; Katahdin 10%; Irish Cobbler 10%; Bliss Triumph 5%; Pontiac, Chippewa, Kennebec 5%
South Dakota	Bliss Triumph 70%; Cobbler 11%; others 19% (Certified Seed)
Tennessee[1]	Irish Cobbler 80%; Sequoia 15%; Bliss Triumph 5%; Katahdin, trace
Texas[1]	Bliss Triumph 60%; White Rose 20%; Irish Cobbler 13%; Pontiac 4%; Katahdin 2%; Red Warba 1%
Utah[1]	White Rose and Bliss Triumph 90%; Netted Gem 5%; Irish Cobbler, Katahdin, Pontiac 5%
Vermont	Katahdin 45%; Green Mountain 30%; Houma 20%; others 5%
Virginia[1]	Irish Cobbler 60%; Chippewa 10%; Green Mountain 10%; Katahdin 9%; Sequoia 5%; others 6%
Washington	Russet Burbank 65%; White Rose 35%
West Virginia	Irish Cobbler and Katahdin 60%; Sebago 20%; Chippewa 10%; others 10%
Wisconsin	Chippewa 25%; Irish Cobbler 25%; Katahdin 20%; Russet Rural 8%; Bliss Triumph 5%; Sebago 5%; Russet Burbank, Russet Sebago, Pontiac, White Rural, Red Warba 10%; others 2%
Wyoming[1]	Bliss Triumph 80%; Irish Cobbler 5%; Russet Burbank 5%; Red Warba, Pontiac, Teton, Kasota, White Rose, others 10%
Alaska	Arctic Seedling 90%; White Rose 5%; Netted Gem 3%; others 2%
Hawaii[1]	Bliss Triumph, British Queen, Sebago

[1] From 1950 Year Book.

TREND IN POTATO STORAGE DESIGN

by

Alfred D. Edgar

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Bureau of Plant Industry, Soils, and Agricultural Engineering, Agricultural Research
Administration, U. S. Department of Agriculture, East Grand Forks, Minn.

(Report of a study in which certain phases were carried on under the Research and Marketing Act of 1946.)

POTATO STORAGE DESIGN has always been influenced by climate, size of operation and relative importance of potatoes in the enterprise, available materials of construction, contemporary markets, handling and management practices.

When potatoes were generally transported by horse-drawn equipment (that was more difficult to back than motor vehicles) storages were generally filled through roof or ceiling hatches. For small operations in the colder part of the late crop area, shallow bins and manual control of ventilation through doors and hatches were all that was needed to get fair storage conditions.

With the common use of motor trucks for hauling to and from fields, the back-in and drive-out alley storage became more practical. The increased emphasis on better grading made the central work and drive alley a common need. The marketing of seed potatoes and special purpose table stock made it necessary to have closer temperature regulation and better understanding of insulation, air circulation and ventilation control.

Under the influence of barrel handling practices in Maine, the desirable effect of the earth on long period storage temperature regulation, in all colder parts of the late crop potato area, and the ease of handling potatoes sideways and downward into bins from a central alley, there followed a period (1925-1945) of deeper bin development. Twenty feet and greater depths became common in the Red River Valley of the North and in Maine. These deep bins were generally filled from an upper level drive, which was about midway in bin depth, to simplify handling problems.

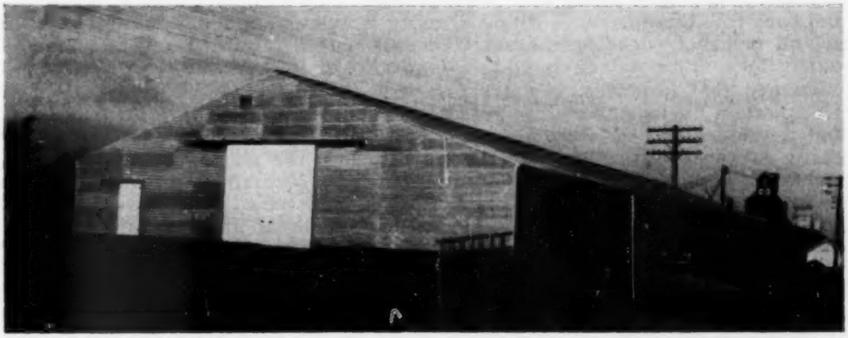
During the period of deep bin development the construction costs of upper drive alleys increased as loads increased from 3 ton wagon loads to 10 ton truck loads. Bin walls and partitions increased in cost as lateral pressures increased from about 60 pounds per square foot at 8 feet depth to about 100 ounds per square foot at 20 feet depth.

It was comparatively easy to remove potatoes from deep below-grade bins as long as potatoes were graded over portable graders. However, the difficulty of moving potatoes from the underground bins became a serious potato injury and cost factor with the increased use of large stationary washing and grading plants.

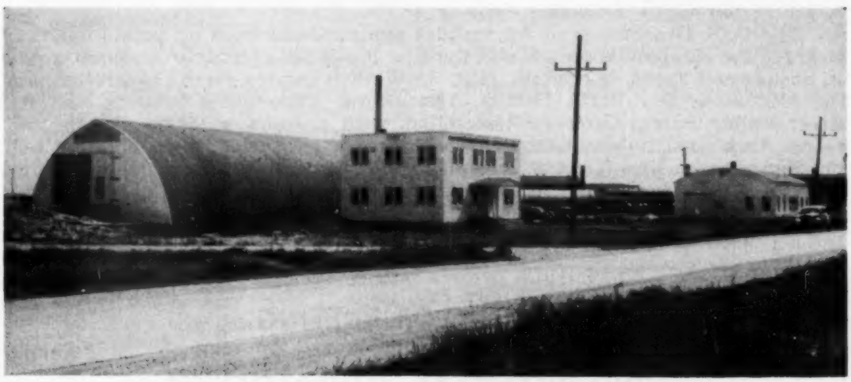
In 1944 an attempt was made to reduce the injury in moving potatoes from basement bins to first floor graders by the introduction of the 40 bushel palletized field transport and storage boxes. No suitable bulk potato harvesters were available so sacked potatoes were emptied into the boxes on trucks in the field from where they were transported to the basement storage and stacked 3 high. The first storage was always full of boxes whether they were filled with potatoes or not. The boxes were dumped and potatoes were conveyed from basement to first floor grader by elevating and cross-conveyor flights with attendant extra drops.

Profiting from the lessons learned in the first installation for field handling and storage in palletized boxes, an Iowa storage provided for stacking boxes 5 high (about 20 feet), added a paved storage yard for empties, a tilting head lift truck for handling and dumping, and a field pick up harvester for filling boxes. This harvest and storage method eliminates handling labor and steps. The method is now practical for only a few large operators because of the cost of lift-

(Continued on Page 28)



STORAGE ILLUSTRATING PRESENT TREND. This 72' x 220' storage is divided by single board position into 4—18' x 100' bins at the sides and 2—36' x 100' bins between. In the center of length is a 20' x 72' cross alley. Sacked potatoes form bulkheads separating bins from cross alley when bins are filled 12' to 18' deep with bulk potatoes. Thermostatic regulation of forced ventilation and circulation is required to maintain a narrow temperature range in the bins.



THE POTATO RESEARCH CENTER, consists of a 40,000 bushel storage with bins of 8, 12, and 20 foot depth, an office and laboratory building and a machine shop for making and remodelling handling equipment.

truck equipment and boxes, and the lack of suitable harvesters for average field conditions.

Idaho has been a leader in the wide, shallow-bin storage, because their dry, cool climate and cheap pole framing material made earth covered storages both suitable and economical. These storages are often 100 feet wide and have bins at about a 60 degree angle with the driveway. This permits trucks to drive past and back into the bins when filling. Gravity circulation and ventilation by means of end driveway door openings and double-slatted bin partitions is generally satisfactory with potatoes stored to a depth of 8 or 10 feet.

Earth roof insulation is not satisfactory in most areas because of heavier precipitation during the storage season. Commercial framing, insulation, sealing, and roofiing materials must be used in these areas. World War II introduced partly fabricated structures for storage use; first the single arch, then double and triple arch roofs. These standardized structures usually are more expensive than conventional buildings but are soundly constructed, and were about the only way to get a new storage in 1948-49 in some areas. In these buildings considerable attention was given to structural requirements and to laying out storage rooms, heating, ventilation, refrigeration, and insulation.

The wide storage with cross-alleys was developed to handle large volumes of potatoes from many growers. By incorporating forced shell circulation and thermostatic regulation of ventilation, partitions for ventilation are not needed, and the cost of the storage is often cut in half, but some partitions are convenient for separating potato lots and varieties.

Cross-alley filling of wide storages seems unsuitable for the colder parts of the late crop area because of the extra cost of several heavy driveway doors. Several trucks can maneuver for unloading at various parts of the storage from one driveway door, when trusses replace posts and unobstructed widths are increased to 18 or more feet. (Fig. 1.)

Attention is directed to the value and limitation of wide and relatively deep above ground storages. They simplify handling to and from storage and cost less for construction, but depend on forced ventilation with thermostatic regulation. Through-bin or shell circulation is needed in such storages for maintaining a narrow temperature range.

The U. S. Department of Agriculture experimental work on potato handling, storage, and shipping is centered in the Red River Valley Potato Research Center in East Grand Forks, Minnesota. (Fig. 2.) Work is carried on in cooperation with the Minnesota and North Dakota Agricultural Experiment Stations, the Red River Valley Potato Growers Association, with growers, shippers and the railroads. Additional potato storage investigation is conducted in cooperation with the New Jersey, New York and Pennsylvania Agricultural Experiment Stations.

(For further information see U.S.D.A. Farmers Bul. No. 1986—"Potato Storage.")

Rules and Regulations Affecting
SHIPMENT OF SEED POTATOES
into various states

Alabama—Certified seed Irish potato tags will only be recognized when issued by properly constituted and recognized officials or agencies of the States or territories of origin and upon determination that minimum requirements of the State of Alabama for certified seed potatoes have been complied with and properly tagged. Lead seals to close containers. (1941)

Connecticut—No restrictions. (1947)

Delaware—No restrictions. (1947)

Florida—It shall be a violation of the Seed Act to use the terms "certified," "registered," "inspected," or any other form of such terms unless the seed potatoes have been inspected and certified by an inspection agency of any State or Country duly recognized and approved by the Commissioner of the State of Florida. (1947)

Georgia—No restrictions. (1946)

Idaho—Must have proper certification tags attached.

Illinois—No restrictions. (1947)

Indiana—Seed potatoes bearing evidence of certification by a Department of Agriculture meet all requirements for entry into Indiana. (1935)

Kentucky—All containers must bear form "B" tags secured from the Director of the Experiment Station. The poundage in the bag should be completely covered by the poundage on the tag. Price of tags vary from 1 cent to 4 cents each according to weight of container. These tags are commonly secured and put on by distributors in Kentucky and not by out-of-state shippers. (1946)

Louisiana—Must register with Department of Agriculture. Bags must be sealed with lead seals. Must attach certificate inside car door. (1944)

Maryland—No law concerning the branding or tagging of potatoes but if it is Maine seed planted to certify in Maryland it must be Florida Tested. (1947)

Massachusetts—No restrictions. (1947)

Michigan—Require only a complete set of inspection reports. (1947)

Minnesota—No restrictions. (1947)

Mississippi—Sale allowed only when certified by duly authorized inspection officials of the state of origin. This means blue tag.

Missouri—No restrictions. (1947)

New Hampshire—No restrictions. (1947)

New Jersey—Regular blue tag.

New York—Regular blue tag.

North Carolina—Potatoes must be certified and of U. S. No. 1 quality.

Ohio—Must bear official certified tag of State doing the certification work, which must bear growers name and address and state where grown. (1947)

Oregon—No restrictions. (1947)

Pennsylvania—Regular blue tag. (1946)

South Carolina—Must bear certified tags issued by proper officials or agencies of state of origin. (1945)

Tennessee—Regular blue tag. (1947)

Oklahoma—Regular blue tag. (1948)

Texas—No specific law but object to sale of certified seed unless it bears genuine tag of official certification. (1947)

Vermont—No restrictions. (1947)

Virginia—No restrictions. (1947)

West Virginia—Each grower or shipper must register with Department of Agriculture at Charleston, W. Virginia. Fee, 1 cent each container. Must have official certification tag. (1947)

Wisconsin—Regular blue tag. (1947)

DOMINION OF CANADA CERTIFIED SEED PRODUCTION

DEPARTMENT OF AGRICULTURE

SCIENCE SERVICE—DIVISION OF PLANT PROTECTION

Estimated Total Production by Province and Variety—In Bushels, 1950

Variety	P.E.I.	N.S.	N.B.	Que.	Ont.	Man.	Sask.	Alta.	B.C.	1950 Total	1949 Total
Katahdin	765,000	101,880	5,862,875	9,825	299,850	750	..	..	8,150	7,048,330	8,447,336
Sebago	2,711,000	22,125	112,675	290	11,450	250	..	..	1,300	2,859,090	2,655,978
Green Mountain	902,000	32,950	784,875	368,170	12,150	350	..	..	28,800	2,129,295	3,847,692
Irish Cobbler	1,346,000	41,080	420,810	25,515	31,300	22,970	270	4,800	1,075	1,893,820	2,449,758
Netted Gem	3,550	550	35,150	1,200	1,450	10,475	2,650	136,450	408,900	600,375	550,504
Pontiac	27,000	..	193,050	..	..	28,055	100	200	35	248,440	157,484
Bliss Triumph	10,500	95,675	314,865	..	..	6,625	1,750	300	..	429,715	370,958
Chippewa	16,700	10,140	14,000	..	53,100	..	..	..	1,200	95,140	79,945
White Rose	..	..	25,950	..	..	..	..	750	62,550	89,250	107,275
Warba	3,600	2,400	6,900	..	2,775	2,680	2,100	3,400	19,250	43,105	26,750
Early Epicure	..	..	..	..	..	..	..	..	33,300	33,300	17,050
Sequoia	25,200	..	..	..	..	..	..	..	150	25,350	22,965
Columbia Russett	..	..	..	..	..	4,080	1,600	..	12,670	18,350	16,825
Canus	..	..	250	270	875	7,425	800	400	375	10,395	10,444
Canso	1,600	1,950	3,850	330	400	320	..	..	410	8,860	..
Rural Russet	..	..	..	..	8,175	..	..	..	..	8,175	..
Early Rose	..	2,150	..	..	200	..	..	..	5,550	7,900	6,125
Early Ohio	..	..	..	..	..	3,850	2,470	50	..	6,370	3,790
Rural New Yorker	..	..	..	..	3,775	..	..	..	..	3,775	300
White Bliss	..	..	3,350	..	..	..	..	..	..	3,350	..
Great Scot	..	..	..	..	..	..	..	..	3,300	3,300	4,435
Red Warba	..	..	..	..	..	3,000	..	..	..	3,000	30
Keswick	900	..	1,400	115	150	120	..	..	70	2,755	..
Mohawk	..	2,225	..	..	..	..	..	..	..	2,225	629
Garnet Chili	..	2,145	..	..	..	..	..	..	..	2,145	1,655
Pawnee	..	1,700	..	..	50	..	..	..	..	1,750	857
Burbank	..	1,000	..	..	..	..	..	..	175	1,175	346
McIntyre	800	500	..	..	..	..	..	..	..	1,300	..
Up-to-Date	..	900	..	..	..	..	..	..	..	900	947
Clark's No. 3	..	725	..	..	..	..	..	..	..	725	550
Sir Walter Raleigh	..	..	..	..	..	..	..	..	550	550	800
Gold Coin	..	..	..	..	..	..	..	..	500	500	200
Other varieties	..	455	..	1,135	..	..	..	..	..	1,590	17,260
TOTAL	5,813,850	320,550	7,780,000	406,850	425,700	90,950	11,740	146,350	588,310	15,584,300	18,801,036

Revised, Ottawa, February 6, 1951.

Canada Department of Agriculture

Science Service—Division of Plant Protection

SEED POTATO CERTIFICATION

District Offices and Officers in Charge

OFFICER-IN-CHARGE
Seed Potato Certification Office
P.O. Box 220
Charlottetown, Prince Edward Island

MR. R. C. LAYTON
Seed Potato Certification Office
Dominion Experimental Station
Kentville, Nova Scotia

MR. C. H. GODWIN
Seed Potato Certification Office
Customs Building
Fredericton, New Brunswick

MR. B. BARIBEAU
Seed Potato Certification Office
P.O. Box 250
Ste. Anne de la Pocatiere, Quebec

MR. W. L. S. KEMP
Seed Potato Certification Office
Ontario Agricultural College
Guelph, Ontario

MR. H. W. WHITESIDE
Seed Potato Certification Office
P.O. Box 129
Barrie, Ontario

MR. F. J. HUDSON
Seed Potato Certification Office
P.O. Box 325
London, Ontario

MR. D. J. PETTY
Seed Potato Certification Office
722 Dominion Public Building
Winnipeg, Manitoba

MR. A. CHARLEBOIS
Seed Potato Certification Office
P.O. Box 744
Estevan, Saskatchewan

MR. J. W. MARRITT
Seed Potato Certification Office
207 Northern Building
Edmonton, Alberta

MR. H. S. MACLEOD
Seed Potato Certification Office
514 Federal Building
Vancouver, British Columbia

Head Office

MR. W. N. KEENAN, *Chief*

MR. J. W. SCANNELL, *Asst. Chief*
Division of Plant Protection
Science Service, Department of Agriculture
Ottawa, Ontario

TOTAL CANADIAN POTATO PRODUCTION—1950

	Acreage (000)		Yield Per Acre Bushels		Production Bushels (000)	
	1949	1950	1949	1950	1949	1950
Prince Edward Island	49.4	45.1	275	255	13,585	11,500
Nova Scotia	21.2	21.7	228	240	4,840	5,208
New Brunswick	61.4	59.9	307	286	18,830	17,131
Quebec	160.0	161.0	133	163	21,333	26,200
Ontario	117.0	113.0	160	192	18,720	21,696
Manitoba	26.0	28.1	113	142	2,947	3,990
Saskatchewan	32.9	31.9	78	103	2,577	3,300
Alberta	25.4	28.3	97	150	2,445	4,245
British Columbia	17.0	16.2	230	233	3,910	3,775
CANADA	510.3	505.2	175	192	89,197	97,045

ASSOCIATIONS IN CANADA ACTIVELY ENGAGED IN THE IMPROVEMENT OF THE POTATO INDUSTRY

The Northern Alberta Certified Seed Potato Growers Association Ltd., Lacombe, Alberta.

Peers Associated Certified Seed Potato Growers of Northern Alberta, McLeod Valley, Alberta.

B. C. Coast Vegetable Marketing Board, 405 Railway Avenue, Vancouver, B. C. Publisher of "The Common Tater."

Northern Certified Seed Potato Co-operative Association, 613 Province Bldg., Vancouver, B.C. President, D. C. Gilmore, 327 Ferguson Road, Sea Island, R.R. 1, Vancouver, B.C.; Secretary, A. Swenson, R.R. 1, Ladner, B.C.; Manager, Charles H. Bradbury, 3676 West 38th Avenue, Vancouver.

Cariboo Certified Seed Potato Association, Box 67, Quesnel, B.C. President, W. A. Johnston, Quesnel; Secretary, J. Rome, Quesnel.

Manitoba Seed Potato Growers Co-op Association, 153 Legislative Bldg., Winnipeg, Manitoba.

New Brunswick Potato Growers' Council, P. O. Box 29, Hartland, N.B.

Potato Growers Association of New Brunswick, Grand Falls, N. B. President, H. L. Mulherin; Secretary, H. W. Mulherin.

Kings County Potato Growers' Association, Canning R.R. 2, Kings County, Nova Scotia. President, Leonard Boylan, R.R. 3, Centreville, N. S.; Vice-President, J. W. Steele, R.R. 3, Canning; Secretary-Treasurer, H. L. Parker, Canning R.R. 2.

Scotts Bay Seed Potato Cooperative Ltd., Scotts Bay, Kings County, Nova Scotia. President, J. W. Steele, Scotts Bay; Vice-President, E. Russell Jess, Scotts Bay; Secretary-Treasurer, C. O. Steele, Scotts Bay.

Ontario Crop Improvement Association (Potato Section), Ontario Department of Agriculture, Parliament Bldgs., Toronto, Ont. Publishers of Potato Peelings. Secretary, Potato Section, R. E. Goodin, Parliament Bldgs., Toronto.

Prince Edward Island Potato Growers' Association, P. O. Box 218, Charlottetown, P. E. I. Secretary-Manager, E. D. Reid, Charlottetown.

Saskatchewan Certified Potato Growers' Association; Extension Dept., University of Saskatchewan, Saskatoon, Sask.

MASHED POTATOES LEAD

Mashed potato is evidently the most popular dish, measured in terms of how often it is served. Next in order are boiled, fried, baked, and creamed potatoes, according to the survey. Three-fourths of the housewives who serve potatoes said they serve them mashed at least once a week; three out of five have them boiled at least once a week. More than half serve potatoes fried one or more times a week, and fewer than half—44 per cent—serve them baked. Less frequent ways of preparing potatoes are French frying, potato pancakes, potato salad, potato cakes, stews, and soups, and potatoes cooked with meat roasts.

Most of the potatoes—about 60 pounds out of every 100—are bought for mashing and boiling. About the same quantity is cooked each way.

RESEARCH PROJECTS AND PERSONS ENGAGED IN CONDUCTING RESEARCH ON IRISH POTATOES

Project	Special Emphasis	Research Worker	Experiment Station or Office Where Located
Potato Breeding and/or Variety Testing		C. H. Dearborn	Palmer, Alaska
		M. F. Babb	Palmer, Alaska
		Glen V. Davis	Davis, Calif.
		E. P. Brasher	Newark, Del.
		A. H. Eddins	Hastings, Fla.
		E. N. McCubbin	Hastings, Fla.
		R. W. Ruprecht	Hastings, Fla.
		F. V. Stevenson	Belle Glade, Fla.
		B. B. Brantley	Experiment, Ga.
		J. E. Bailey	Experiment, Ga.
		J. M. Reader	Moscow, Idaho
	Chipping quality	F. L. Blankenburg	Ames, Iowa
	Disease control	W. J. Hooker	Ames, Iowa
	Mosaic	Roland G. Timian	Ames, Iowa
		Clande L. King	Manhattan, Kan.
		C. C. Singletary	Manhattan, Kan.
		Julian C. Miller	Baton Rouge, La.
		John C. Noonan	Baton Rouge, La.
	Bact. ring rot and latent mosaic	Reiner Bonde	Orono, Maine
	Leafroll and latent mosaic	Donald Folsom	Orono, Maine
	Latent mosaic	G. W. Simpson	Orono, Maine
		Don Merriam	Presque Isle, Maine
	Scab, rhiz.	C. V. Kightlinger	Amherst, Mass.
		R. A. Jehle	College Park, Md.
	Scab	J. H. Muncie	East Lansing, Mich.
	Scab	E. J. Wheeler	East Lansing, Mich.
		Carl J. Eide	St. Paul 1, Minn.
		Fred A. Krantz	St. Paul 1, Minn.
		Charles E. Logsdon	St. Paul 1, Minn.
		M. M. Afanasiev	Bozeman, Mont.
		L. C. Harris	Lincoln 1, Nebr.
		Ruth Leverton	Lincoln 1, Nebr.
		R. B. O'Keefe	Lincoln 1, Nebr.
		H. O. Werner	Lincoln 1, Nebr.
		John C. Campbell	New Brunswick, N. J.
	Late blight	J. R. Livermore	Ithaca, N. Y.
	Late blight	J. C. Peterson	Ithaca, N. Y.
	Late blight	F. M. Blodgett	Ithaca, N. Y.
	Late blight	Fred D. Cochran	Raleigh, N. C.
		L. W. Nielsen	Raleigh, N. C.
		Frank Haynes	Raleigh, N. C.
	Latent mosaic	W. G. Hoyman	Fargo, N. D.
		Robert Johansen	Fargo, N. D.
		Eunice Kelly	Fargo, N. D.
		Harold Mattson	Fargo, N. D.
		R. L. Post	Fargo, N. D.
		J. H. Schultz	Fargo, N. D.
		R. L. Witz	Fargo, N. D.
		J. S. Cobb	State College, Pa.
		W. R. Mills	State College, Pa.
		Wm. M. Epps	Charleston, S. C.
		Floyd S. Andrews	Blacksburg, Va.
		M. M. Parker	Norfolk, Va.
		M. E. Gallegly	Morgantown, W. Va.
		J. G. Leach	Morgantown, W. Va.
		K. C. Westover	Morgantown, W. Va.
		Seth Barton Locke	Pullman, Wash.
		J. D. Menzies	Prosser, Wash.
		C. L. Vincent	Pullman, Wash.
	Solanum Introduction Sta.	R. W. Hougas	Madison, Wis.
		G. H. Rieman	Madison, Wis.
	Ring rot, scab resistance	William A. Riedl	Laramie, Wyo.
		G. H. Starr	Laramie, Wyo.
	Virus	H. C. Walters	Laramie, Wyo.
	Scab resistance	L. A. Schaal (USDA)	Ft. Collins, Colo.
	Scab resistance	W. C. Edmundson (USDA)	Greeley, Colo.
	Scab and virus resistance	R. H. Johansen (USDA)	Fargo, N. D.
	Leader Western Region	John G. McLean (USDA)	Aberdeen, Idaho
	Cytogenetics	Wm. Mishanec (USDA)	Ames, Iowa
	Leader North-Central Region	C. E. Peterson (USDA)	Ames, Iowa
	Leader Southern Region	T. P. Dykstra (USDA)	Baton Rouge, La.
	Leader Northeast Region	R. V. Akeley (USDA)	Presque Isle, Maine
	Disease Resistance	E. S. Schultz (USDA)	Beltsville, Md., and Presque Isle, Me.
	Leader National Breeding Program	F. J. Stevenson (USDA)	Beltsville, Md.

(Continued on Page 35)

Project	Special Emphasis	Research Worker	Experiment Station or Office Where Located
Potato Breeding and/or Variety Testing	Cytogenetics	R. W. Back, Jr. (USDA)	College Park, Md.
	Adaptability and scab	F. L. Lauer (USDA)	St. Paul, Minn.
	P. *infestans* races	C. E. Logsden (USDA)	St. Paul, Minn.
	Hort characters and vitamin C	W. L. Jewell (USDA)	Lincoln, Nebr.
	Black spot and blight	M. K. Corbett (USDA)	Ithaca, N. Y.
	Scab resistance	E. C. Gasiorkiewicz (USDA)	Madison, Wis.
		John L. Bowers	Fayetteville, Ark.
		J. K. Greig	Fayetteville, Ark.
		Arthur Hawkins	Storrs, Conn.
		E. P. Brasher	Newark, Del.
		E. M. Rahn	Newark, Del.
		J. E. Bailey	Experiment, Ga.
		George W. Woodbury	Moscow, Idaho
		N. K. Ellis	LaFayette, Ind.
		C. E. Cunningham	Orono, Maine
		S. C. Junkins	Orono, Maine
		Karol Kucinski	Amherst, Mass.
		Fred A. Krantz	St. Paul 1, Minn.
		W. S. Anderson	State College, Miss.
		W. F. Jenkins	State College, Miss.
		H. N. Metcalf	Bozeman, Mont.
	Chipping quality	Paul T. Blood	Durham, N. H.
		F. A. Romshe	Blair, Okla.
		A. E. Gross	Klamath Falls, Ore.
		Donald A. Schallock	Kingston, R. I.
		W. C. Barnes	Clemson, S. C.
		W. M. Epps	Clemson, S. C.
		T. R. Gilmore	Crassville, Tenn.
		D. W. Thorne	Logan, Utah
		C. L. Vincent	Pullman, Wash.
		G. H. Rieman	Madison, Wis.
		A. M. Binkley	Fort Collins, Colo.

(Continued on Page 37)

Project	Special Emphasis	Research Worker	Experiment Station or Office Where Located
Cultural Studies	Soil structure	John Bushnell	Wooster, Ohio
	Vine killing	Ora Smith	Ithaca, N. Y.
	Vine killing	Herbert Findlen (USDA)	East Grand Forks, N. D.
	Vine killing	Robert Kunkel	Fort Collins, Colo.
		M. F. Babb	Palmer, Alaska
		C. H. Dearborn	Palmer, Alaska
		Krvo Kallio	Palmer, Alaska
	Vine killing	C. I. Branton	Palmer, Alaska
		James E. Knott	Berkeley, Calif.
		Walter C. Sparks	Moscow, Idaho
	Weed control	L. C. Erickson	Moscow, Idaho
		N. K. Ellis	Lafayette, Ind.
		E. L. Denisen	Ames, Iowa
	Arsenic residue	C. E. Cunningham	Orono, Maine
		M. E. Highlands	Orono, Maine
		J. W. Slosser	Orono, Maine
	Erosion control	R. A. Struchtemeyer	Orono, Maine
	Arsenic residue	B. E. Plummer, Jr.	Orono, Maine
	Tuber size	G. L. Terman	Orono, Maine
	Effect on quality	H. C. Moore	East Lansing, Mich.
	Tillage, rotation	J. Tyson	East Lansing, Mich.
	Effect on quality	E. J. Wheeler	East Lansing, Mich.
	Dryland crop rotation	H. W. Chapman	Lincoln 1, Neb.
	Dryland crop rotation	J. F. Davidson	Lincoln 1, Neb.
		Robert E. Nylund	St. Paul 1, Minn.
	Vine killing	Wm. G. Hoyman	Fargo, N. D.
	Dryland crop rotations	J. E. Livingston	Lincoln 1, Neb.
	Dryland crop rotations	H. F. Rhoades	Lincoln 1, Neb.
	Dryland crop rotations	H. O. Werner	Lincoln 1, Neb.
	Erosion control	L. T. Kardos	Durham, N. H.
	Rotations	Ford S. Prince	Durham, N. H.
	Weed control	T. E. Odland	Kingston, R. I.
		K. C. Westover	Morgantown, W. Va.
	Vine killing	Robert Kunkel	Fort Collins, Colo.
	Hormones	Jess Fultz	Fort Collins, Colo.
	Crop rotations	John C. Campbell	New Brunswick, N. J.
	Breaking rest period	R. A. Jehle	College Park, Md.
Disease Studies and Control	Leak	George Lane	Fort Collins, Colo.
		O. H. Elmer	Manhattan, Kan.
	Scab, fusarium	J. H. Muncie	East Lansing, Mich.
	Dry rot and "Z" disease	E. J. Wheeler	East Lansing, Mich.
		L. W. Nielsen	Raleigh, N. C.
	Blight	W. E. Brentzel	Fargo, N. D.
	Fungicides	Wm. G. Hoyman	Fargo, N. D.
	Ring rot	C. I. Nelson	Fargo, N. D.
	S. Bact. scab	J. L. Parsons	Fargo, N. D.
	Viruses	R. H. Larson	Madison, Wis.
		Donald M. Coe	Palmer, Alaska
		Max W. Gardner	Berkeley 4, Calif.
	Wilt	W. G. Keyworth	New Haven, Conn.
	Blight	J. W. Heuberger	Newark, Del.
	Blight	Richard C. Landeburg	Moscow, Idaho
		A. I. Bourne	Amherst, Mass.
	Blight	C. V. Kightlinger	Amherst, Mass.
	Virus dissemination	R. Bonde	Orono, Maine
	Virus dissemination	G. W. Simpson	Orono, Maine
	Virus dissemination	D. Folson	Orono, Maine
	Bact. ring rot	R. Bonde	Orono, Maine
	Quality	D. Folsom	Orono, Maine
		C. H. Merchant	Orono, Maine
		F. W. Piekert	Orono, Maine
		R. B. Rhoades	Orono, Maine
	Seed disinfection, blight	R. Bonde	Orono, Maine
		B. E. Plummer, Jr.	Orono, Maine
	Breeding	W. J. Hooker	Ames, Iowa
	Breeding	C. E. Peterson	Ames, Iowa
	Breeding	Roland G. Timian	Ames, Iowa
		R. A. Jehle	College Park, Md.
	Scab, blight, viruses	Carl J. Eide	St. Paul 1, Minn.
	Blight	Donald Olmsted	St. Paul 1, Minn.
		John A. Milbrath	Corvallis, Ore.
		Roy A. Young	Corvallis, Ore.
	Virus	S. B. Locke	Pulman, Wash.
	Virus	Avery E. Rich	Pulman, Wash.
	Virus	C. L. Vincent	Pulman, Wash.
	Blight	John C. Campbell	New Brunswick, N. J.
		M. E. Gallegly	Morgantown, W. Va.
		J. G. Leach	Morgantown, W. Va.
		M. C. Richards	Durham, N. H.

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Project	Special Emphasis	Research Worker	Experiment Station or Office Where Located
Economic Studies		George E. Frick	Storrs, Conn.
		Irving F. Fellows	Storrs, Conn.
		Vernon E. Ross	Storrs, Conn.
		H. D. Bartlett	Orono, Maine
		C. H. Merchant	Orono, Maine
		A. L. Perry	Orono, Maine
		W. E. Schrumpf	Orono, Maine
		H. C. Woodward	Orono, Maine
		Richard A. King	Raleigh, N. C.
		W. K. Burkett	Durham, N. H.
		M. E. Cravens	East Lansing, Mich.
		Pauline Paul	East Lansing, Mich.
Fertilizers and Soils		John L. Bowers	Fayetteville, Ark.
		J. G. Greig	Fayetteville, Ark.
		Arvo Kallio	Palmer, Alaska
	Quality	Allan H. Mick	Palmer, Alaska
		Robert Kunkel	Fort Collins, Colo.
		Paul W. Leeper	College Sta., Texas
		C. A. Burleson	College Sta., Texas
		B. A. Brown	Storrs, Conn.
		Arthur Hawkins	Storrs, Conn.
		E. J. Rubins	Storrs, Conn.
		J. E. Bailey	Experiment, Ga.
	Radio-iso types	J. V. Jordan	Moscow, Idaho
		C. C. Singletary	Manhattan, Kan.
	Urea and sugar	E. M. Emmert	Lexington, Ky.
		J. E. Klinker	Lexington, Ky.
		G. L. Terman	Orono, Maine
		B. E. Plummer, Jr.	Orono, Maine
	DDT and Chlorinated Champhene residues	G. W. Simpson	Orono, Maine
	DDT and Chlorinated Champhene residues	G. L. Terman	Orono, Maine
	DDT and Chlorinated Champhene residues	B. E. Plummer, Jr.	Orono, Maine
	DDT and Chlorinated Champhene residues	E. R. Tobey	Orono, Maine
	Arsenic residues	G. L. Terman	Orono, Maine
		C. E. Cunningham	Orono, Maine
		J. H. Axley	College Park, Md.
		J. Tyson	East Lansing, Mich.
		Victor N. Lambeth	Columbia, Mo.
		F. M. Harrington	Bozeman, Mont.
	Rotations	Ford S. Prince	Durham, N. H.
	Effect on chips	Paul T. Blood	Durham, N. H.
		V. E. Spencer	Reno, Nevada
	Potash and calcium on quality	H. J. Evans	Raleigh, N. C.
		Ralph T. Brown	Baton Rouge, La.
	N. P. K.	C. O. Clagett	Fargo, N. D.
		John C. Campbell	New Brunswick, N. J.
	Zinc and boron	Wm. G. Hoyman	Fargo, N. D.
	Zinc and boron	E. B. Norum	Fargo, N. D.
		Ralph A. Young	Fargo, N. D.
		M. J. Johnson	Redmond, Ore.
	Irrigation	C. A. Larson	Hermiston, Ore.
		A. W. Marsh	Corvallis, Ore.
		W. L. Powers	Corvallis, Ore.
		K. C. Berger	Madison, Wis.
		T. E. Odland	Kingston, R. I.
Food Manufacture		Carl E. Hendel (USDA)	Albany, Calif.
		Horace K. Burr (USDA)	Albany, Calif.
		Mildred M. Boggs (USDA)	Albany, Calif.
		R. L. Olson (USDA)	Albany, Calif.
		W. O. Harrington (USDA)	Albany, Calif.
		F. P. Griffiths (USDA)	Albany, Calif.
		P. H. Heinze (USDA)	Beltsville, Md.
Harvesting and Handling		Roy Bainer	Berkeley, Calif.
		Walter C. Sparks	Moscow, Idaho
		H. D. Bartlett	Orono, Maine
		R. B. Hopkins	Orono, Maine
		F. W. Peikert	Orono, Maine
		Harold Mattson	Fargo, N. D.

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Project	Special Emphasis	Research Worker	Experiment Station or Office Where Located
Harvesting and Handling		Eunice Kelly	Fargo, N. D.
	Bruising resistance	Perry Hemphill	Fargo, N. D.
		R. W. Witz	Fargo, N. D.
		J. B. Rodgers	Corvallis, Ore.
	Harvesting equipment	A. H. Glaves (USDA)	East Grand Forks, Minn.
	Grading	J. G. Gregory	Fort Collins, Colo.
Insect Control and Related Factors		R. H. Washburn	Palmer, Alaska
		Edward O. Essig	Berkeley 4, Calif.
	Wireworms	Nelly Turner	New Haven, Conn.
		W. F. Morofsky	East Lansing, Mich.
Insect Control and Related Factors		Leslie Daniels	Fort Collins, Colo.
	Spread of leafroll	Arthur J. Walz	Moscow, Idaho
	Nematodes	Eugene Dallimore	Moscow, Idaho
	Aphids—leafroll	W. A. Shands (USDA)	Orono, Maine
	Aphids—leafroll	G. W. Simpson	Orono, Maine
	Wireworms	J. H. Hawkins	Orono, Maine
		Allan G. Peterson	St. Paul 1, Minn.
		A. I. Bourne	Amherst, Mass.
		O. S. Bare	Lincoln 1, Neb.
		R. E. Hill	Lincoln 1, Neb.
		M. H. Muma	Lincoln 1, Neb.
		J. A. Munro	Fargo, N. D.
		R. L. Post	Fargo, N. D.
		G. Hoyman	Fargo, N. D.
		J. G. Conklin	Durham, N. H.
	Insecticides	J. C. Campbell	New Brunswick, N. J.
	Wireworms	J. P. Reed	New Brunswick, N. J.
	Wireworms	B. B. Pepper	New Brunswick, N. J.
		Clark Amen	Corvallis, Ore.

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EXACT WEIGHT Scale checking 5 lb. cellophane wrapped premium box of specially selected potatoes—T. E. Wilde & Son, Inc., Sacramento, Calif.

Project	Special Emphasis	Research Worker	Experiment Station or Office Where Located
Irrigation		Frank J. Veihmeyer	Berkeley 4, Calif.
	Legal aspects	R. J. Penn	Madison, Wis.
		R. A. Struchtemeyer	Orono, Maine
		L. C. Harris	Lincoln 1, Neb.
		H. F. Rhoades	Lincoln 1, Neb.
		D. A. Romshe	Blair, Okla.
		C. A. Larson	Hermiston, Ore.
		John A. Currie	Madras, Ore.
		R. S. Bell	Kingston, R. I.
		Donald A. Schallock	Kingston, R. I.
	Soil types	John Bushnell	Wooster, Ohio
		John C. Campbell	New Brunswick, N. J.
Manufacture of Products	Hydrolysis for use in fermentation adhesives, sizes, etc.	C. F. Woodward, R. H. Treadway, E. A. Weaver, E. H. Heisler, Ann S. Hunter	Eastern Reg. Res. Lab., Philadelphia, Pa.
	Starch utilization	C. F. Woodward, R. H. Treadway	Eastern Reg. Res. Lab., Philadelphia, Pa.
	Nitrogen constituents	C. F. Woodward, E. Yanovsky, R. H. Treadway, E. A. Talley	Eastern Reg. Res. Lab., Philadelphia, Pa.
	Starch manufacture	R. K. Eskew, P. W. Edwards, W. W. Howerton	Eastern Reg. Res. Lab., Philadelphia, Pa.
	Methods of making food, feed and industrial products	R. K. Eskew, P. W. Edwards, A. Hoersch, Jr.	Eastern Reg. Res. Lab., Philadelphia, Pa.
	Texture of potato tissue	T. Whittenberger	Eastern Reg. Res. Lab., Philadelphia, Pa.
	Starch molecules	L. P. Witnauer	Eastern Reg. Res. Lab., Philadelphia, Pa.
	Structure of starch granules	G. S. Nutting	Eastern Reg. Res. Lab., Philadelphia, Pa.
	Potato chip manufacture	H. D. Brown	Wooster, Ohio
	Potato chip manufacture	Robert Johnson	Wooster, Ohio
Marketing and Related Factors		J. R. Magness (USDA)	Beltsville, Md.
		Raymond Burdick	Fort Collins, Colo.
		Clayton L. Libeau	Moscow, Idaho
		Robert A. Fitzpatrick	Amherst, Mass.
		H. D. Bartlett	Orono, Maine
		C. H. Merchant	Orono, Maine
		F. W. Peikert	Orono, Maine
		A. L. Perry	Orono, Maine
		W. E. Schrumpf	Orono, Maine
		H. C. Woodward	Orono, Maine
		M. E. Cravens	East Lansing, Mich.
		H. C. Moore	East Lansing, Mich.
		Pauline Paul	East Lansing, Mich.
		E. J. Wheeler	East Lansing, Mich.
		Robert E. Nyland	St. Paul 1, Minn.
		Fred A. Krantz	St. Paul 1, Minn.
		Clarence Miller	Lincoln 1, Neb.
		H. O. Werner	Lincoln 1, Neb.
		James R. Bowring	Durham, N. H.
		Perry V. Hemphill*	East Grand Forks, Minn.
		H. H. Bakken	Madison, Wis.
		George B. Davis	Corvallis, Ore.

* Red River Valley Potato Growers Association cooperating.

Project	Special Emphasis	Research Worker	Experiment Station or Office Where Located
Nutritional Value and Related Studies		Ella Woods	Moscow, Idaho
	Ascorbic acid	Rita Belle Attaya	Baton Rouge 3, La.
	Ascorbic acid	Julian C. Miller	Baton Rouge 3, La.
	Ascorbic acid	John C. Noonan	Baton Rouge 3, La.
	Ascorbic acid	R. E. Webb	Baton Rouge 3, La.
	Dairy cows	H. C. Dickey	Orono, Maine
	Poultry feed	R. W. Gerry	Orono, Maine
	Dairy cows	M. E. Highlands	Orono, Maine
	Potato products	M. E. Highlands	Orono, Maine
	Potato products	J. J. Licciardello	Orono, Maine
	Poultry feed	J. R. Smyth	Orono, Maine
	Culinary quality	H. C. Moore	East Lansing, Mich.
	Culinary quality	E. J. Wheeler	East Lansing, Mich.
	Livestock	Joe B. Johnson	Corvallis, Ore.
	Livestock	A. C. Warnick	Corvallis, Ore.
	Culinary quality	Flora Hanning	Madison, Wis.
	Canning quality	K. G. Weckel	Madison, Wis.

(Continued on Page 44)

Project	Special Emphasis	Research Worker	Experiment Station or Office Where Located
Physiological Studies	Virus infection	J. H. Muncie	East Lansing, Mich.
	Virus infection	F. L. Wynd	East Lansing, Mich.
	Factors affecting yield and quality	Robert E. Nylund	St. Paul 1, Minn.
	Metabolism	H. W. Chapman	Lincoln 1, Neb.
	Ascorbic acid content	Ruth Leverton	Lincoln 1, Neb.
	Ascorbic acid content	H. O. Werner	Lincoln 1, Neb.
Seed Stock Improvement		Richard C. Ladeburg	Moscow, Idaho
		Hugh C. McKay	Moscow, Idaho
		B. L. Richards	Logan, Utah
		H. M. Darling	Madison, Wis.
	Leaf roll and seed research	C. W. Frutchey	Garber Center, Colo.
Storage and Related Factors		M. F. Babb	Palmer, Alaska
		Stewart L. Dallyn	Baton Rouge, La.
		H. D. Bartlett	Orono, Maine
	Seed value	C. E. Cunningham	Orono, Maine
		R. B. Hopkins	Orono, Maine
	Handling equipment	F. W. Peikert	Orono, Maine
	Handling equipment	J. W. Slosser (USDA)	Orono, Maine
		Robert E. Nylund	St. Paul 1, Minn.
	Seed	H. O. Werner	Lincoln 1, Neb.
		M. G. Cropsey	Corvallis, Ore.
	Handling equipment	A. D. Edgar (USDA)	East Grand Forks, Minn.
	Physiology	J. M. Lutz (USDA)	East Grand Forks, Minn.
		W. V. Hukill	Ames, Iowa.

FOODS

Nutritive Value of 1 Pound of Selected Foods, as Purchased

Source: Bureau of Human Nutrition and Home Economics in cooperation with the National Research Council.

Food Item	Food Energy Calories	Protein Grams	Fat Grams	Carbohydrate Grams	Calcium Milligr.	Phosphorus Milligr.	Iron Milligr.	Vitamin A Value Internat'l Units	Thiamine Milligr.	Riboflavin Milligr.	Niacin Milligr.	Ascorbic Acid Milligr.
Ice cream, plain [1]	953	18.2	55.8	94.4	599	472	.5	2,450	.17	.84	.5	1
Hamburger	1,433	72.6	127	0	41	781	10.9	(0)	.45	.57	19.6	0
Peanut butter	2,808	118.5	217.0	95.3	336	1,784	8.6	0	.89	.72	73.5	(0)
Vegetables:												
Beans, lima, green	239	13.6	1.5	42.8	115	288	4.2	520	.45	.26	1.7	58
Carrots	179	4.8	1.2	37.2	156	148	3.2	48,000	.27	.26	2.0	24
Peas, green	206	13.7	0.8	36.1	45	249	3.9	1,390	.72	.37	4.2	54
POTATOES	325	7.6	0.4	72.8	42	213	2.7	70	.40	.15	4.4	64
Spinach	92	8.6	1.1	11.9	[2]	205	11.2	35,040	.44	.90	2.6	219
Sweet potatoes	488	7.0	2.7	108.8	117	191	2.7	30,030 [3]	.37	.23	2.8	86
Tomatoes	91	4.0	1.2	16.0	44	108	2.4	4,380	.24	.16	2.5	93
DEHYDRATED POTATOES	1,647	32.2	3.2	372.3	114	468	16.8	(0)	1.15	.45	21.8	118
Bread:												
White, enriched	1,186	38.6	9.1	237.4	(254)	(454)	(8.2)	(0)	(1.10)	(.70)	(10.0)	0
Cake, light batter	1,486	29.1	37.2	258.8	281	(572)	9.1	..	.15	.44	3.0	0
Pie, apple	1,208	(13.2)	(43.6)	(190.7)	(50)	(100)	8.6	(0)	(.23)	(.18)	1.8	(0)
Macaroni: spaghetti	1,636	59.0	6.4	335.5	100	654	5.4	(0)	.59	.36	9.5	0

1 Calculated from ingredients.
2 301 mg., may not be available because of presence of oxalic acid.
3 If pale varieties only were used, the value would be very much lower.

PERIODICALS OF INTEREST TO THE POTATO INDUSTRY

Agricultural Institute Review, 1005 Confederation Bldg., Ottawa, Ont., Canada. Published bi-monthly by the Agricultural Institute of Canada. Editor, Hilda Gray. Subscription price $2.00 per year.

American Potato Journal, New Brunswick, N. J. Published monthly by the Potato Association of America. Editor, Dr. William H. Martin. Subscription price $4.00 per year.

The Agronomy Journal, 2702 Monroe St., Madison 5, Wisc. Published monthly by the American Society of Agronomy. Editor, Maurice R. Haag. Subscription price $10.00 in U. S. and Canada, $11.00 elsewhere.

The Badger Common 'Tater, Fidelity Bank Bldg., Antigo, Wis. Published monthly by the Potato Growers of Wisconsin, Inc. Editor, Roger Stake. Price—free.

Better Farming Methods, Mount Morris, Illinois. Published monthly. Editor, Milton B. Dunk. Subscription price $2.00 per year.

Chemurgic Digest, Room 3108, 350 Fifth Ave., New York 1, N. Y. Published monthly. Editor, Douglas Dies. Subscription price of $5.00 is included with $10.50 annual membership.

Colorado Potato Grower, 601 Cooper Bldg., Denver 2, Colo. Published monthly by the Colorado Potato Growers Exchange. Editor, W. F. Heppe. Subscription price $1.00 per year.

The Common-Tater, Vancouver, B. C., Canada. Published quarterly by the British Columbia Coast Vegetable Marketing Board. Editor, Earl A. Mackay. Subscription price—free on request.

Country Life, Box 700, Vernon, British Columbia, Canada. Published monthly. Official organ of B. C. Coast and Interior Vegetable Marketing Boards. Editor, C. A. Hayden. Subscription price $1.00 per year Canada, $2.00 U. S.

Fruit & Vegetable Review, Orange Savings Bank Bldg., Orange, Calif. Published monthly. Editor, Briant Sando. Subscription price $3.00 per year.

The Guide Post, 1100 North 77th St., Allentown, Penna. Published monthly by the Pennsylvania Cooperative Potato Growers, Inc. Editor, Charles W. York. Subscription price $1.00 per year.

Hints to Potato Growers, New Brunswick, N. J. Published monthly by the New Jersey State Potato Association. Editor, John C. Campbell. Subscription price $3.00 per year.

M. P. G. News, Presque Island, Maine. Published monthly by the Maine Potato Growers, Inc. Editor, Lloyd R. Williams. Subscription price—free on request.

Market Growers Journal, 31 North Summit St., Akron 8, Ohio. Published monthly. Editor, Edward S. Babcox, Jr. Subscription price $2.00 one year, $3.00, 2 years, $5.00, 5 years.

Michigan Potato Growers Exchange, 116 West Harris St., Cadillac, Mich. Published monthly by the Michigan Potato Growers Exchange, Inc. Editor, F. P. Hibst. Subscription price 50c per year.

The Organic Farmer, 6th and Minor Sts., Emmaus, Penna. Published monthly. Editor, J. I. Rodale. Subscription price, $3.00 per year.

The Packer, 201 Delaware St., Kansas City 6, Mo. Published weekly. Editor, George H. Gurley. Subscription price $3.00 per year.

La Pomme de Terre Francaise. Published monthly by the Fédération Nationale des Producteurs de Plants de Pommes de terre. Editor, Henri Demesmay. Subscription price 250 francs per year.

The Potato Chipper, 1360 Hanna Bldg., Cleveland 15, Ohio. Published monthly by the National Potato Chip Institute. Managing Editor, Harvey F. Noss. Associate Editor, Robert E. Hall. Subscription price $2.00 per year.

The Potato Journal, c/o R. G. Robinson Ltd., Box 4, Papanui, Christchurch N.W. 2, New Zealand. Published quarterly. Editor, R. G. Robinson. Subscription price—free.

Potato News. Published by Empire State Potato Club, Inc., Georgetown, N. Y. Editor, H. J. Evans. Subscription price—free.

The Produce News, 6 Harrison St., New York City. Published weekly. Editor, A. E. Haglund. Subscription price $3.00 per year.

Scientific Agriculture, Confederation Bldg., Ottawa, Ont., Canada. Published monthly by the Agricultural Institute of Canada. Editor, C. Gordon O'Brien. Subscription price $3.00 per year.

Seed Journal, College Station, Fargo, North Dakota. Published quarterly. Subscription price $1.00 per year.

Seeder, State House, Boise, Idaho. Published quarterly by the Idaho Crop Improvement Ass'n. Editor, Neil Blair. Subscription price—free.

Spud Notes, Colorado A. and M. College, Fort Collins, Colorado. Published monthly by the Extension Service, Colorado A. and M. College. Editor, Cecil W. Frutchey. Subscription price—free.

"Spuditems," Bank Bldg., Monte Vista, Colo. Published weekly by the San Luis Valley Potato Board of Control. Editor, Wilbur G. Erickson. Subscription price—free.

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The Spudlight, 2017 S Street, N.W., Washington 9, D. C. Published weekly by the Potato Division, United Fresh Fruit & Vegetable Association. Editor, Kris P. Bemis. Subscription price $25.00 per year.

Tabb Potato Service, 9 South Kedzie Ave., Chicago, Ill. Published weekly. Editor, L. J. Crescio. Subscription price $50.00 per year.

The Taterstater, Presque Isle, Maine. Published quarterly by the Aroostook Potato Growers, Inc. Editor, Donald C. Umphrey. Subscription price—free.

The Valley Potato Grower, Box 301, East Grand Forks, Minn. Published semi-monthly by the Red River Valley Potato Growers Association. Editor, W. M. Case. Subscription price—free.

Vee-Gee Messenger, Preston, Maryland. Published quarterly. Editor, Max Chambers. Subscription price 20c per year, $1.00, six years.

Western Grower and Shipper, 606 South Hill St., Los Angeles 14, Calif. Published monthly by the Western Growers Association. Editor, George Drake. Subscription price $2.00 per year, $5.00, 3 years.

What's New in Crops & Soils, 2702 Monroe Street, Madison 5, Wisc. Published nine times a year by The American Society of Agronomy. Editor, L. G. Monthey. Subscription price $3.00 per year. (Special group rates.)

World Crops, 17 Stratford Place, London, W. I. England. Published monthly. Editor, Sir Harold A. Tempany. Subscription price, $5.00 one year, $10.00 3 years.

POTATO GRADING

A new accurate method of weight separation makes it possible to package potatoes for a specific purpose—for frying, boiling or baking.

The result of research by Cornell University Agricultural Experiment Station, the new method depends on the separation of potato types by specific gravity. Since the mealiest potatoes are best for baking and have the highest specific gravity, they sink in salt water solution where the lighter boilers and fryers would float. The other two are separated in correspondingly weaker solutions.

The potatoes are washed to rinse off the salt water, packaged, and marketed.

Although the principle has been used in German potato product manufacture for over 50 years, it has not been applied to marketing in this country. Now some New York state food stores will conduct consumer reaction tests . . . all on U. S. No. 1 potatoes. The graded potatoes will be sold at the same price as the ungraded lots, but consumers will be asked if they would be willing to pay a premium for the graded type.

Potato processors can benefit from this sorting method as well as the housewife. Processors want to know the amount of solids they can expect from the potato crop and by the specific gravity method, they can easily tell what the weight of their yield will be.

MERCHANTABLE POTATO STOCKS AS OF JANUARY 1, 1951 WITH COMPARISONS

January 1, 1951 Merchantable Potato Stocks Largest of Record

Stocks of merchantable potatoes held on January 1, 1951 by growers and local dealers in or near the areas where produced are the largest January 1 holdings of record. Combined grower and dealer holdings of 160,650,000 bushels exceed the January 1, 1950 stocks of 150,590,000 bushels by 7 per cent and are 6 per cent larger than the previous record-large stocks of 152,170,000 bushels held January 1, 1947. Stocks are large in all sections of the country and are particularly heavy in the West. In the East, holdings are somewhat smaller than the unusually large holdings of January 1, 1950. Combined holdings in North Dakota and Minnesota are about the same as the stocks on hand January 1, 1950.

POTATOES (IRISH): MERCHANTABLE STOCKS IN HANDS OF GROWERS AND DEALERS ON JANUARY 1 IN THE 37 LATE AND INTERMEDIATE STATES[1]

GROUP AND STATE	10-year average Jan. 1, 1936-45[2]	January 1, 1948	January 1, 1949	January 1, 1950[3]	January 1, 1951[4]
	Crops of 1935-44	Crop of 1947	Crop of 1948	Crop of 1949	Crop of 1950
			Thousand bushels		
SURPLUS LATE STATES:					
Maine	26,697	43,850	41,440	50,020	42,260
New York	8,193	7,920	9,000	11,700	9,680
Pennsylvania	6,290	6,450	7,060	8,000	9,120
Michigan	8,082	4,430	6,470	7,400	7,820
Wisconsin	4,171	2,000	2,700	3,160	4,600
Minnesota	6,492	8,370	7,790	9,200	9,690
North Dakota	5,573	9,620	8,900	11,390	10,710
South Dakota	390	690	980	540	1,100
Nebraska	3,521	3,150	4,240	4,200	5,830
Montana	552	770	1,340	1,220	1,430
Idaho	12,809	12,000	20,720	16,600	25,820
Wyoming	885	1,100	1,090	1,040	1,030
Colorado	5,863	6,500	6,660	7,370	7,980
Utah	763	770	1,190	1,420	1,670
Nevada	206	240	180	250	260
Washington	2,653	920	2,250	1,780	3,310
Oregon	3,150	3,000	3,940	4,600	5,200
California (Late)	2,660	1,890	2,860	3,370	4,720
18 SURPLUS LATE	98,949	113,670	128,810	143,260	152,230
OTHER LATE STATES:					
New Hampshire	398	330	320	450	440
Vermont	547	380	410	460	400
Massachusetts	469	750	680	970	760
Rhode Island	192	520	450	400	510
Connecticut	904	1,960	1,680	1,840	2,210
West Virginia	237	270	60	80	110
Ohio	1,662	960	1,550	1,390	1,790
Indiana	882	750	930	830	1,120
Illinois	194	20	40	30	20
Iowa	442	100	120	130	130
New Mexico	54	40	[illegible]	30	30
11 OTHER LATE	5,980	6,080	6,270	6,610	7,520
29 LATE STATES	104,929	119,750	135,080	149,870	159,750
INTERMEDIATE STATES:					
New Jersey	373	390	340	280	330
Delaware	53	40	20	40	30
Maryland	175	160	150	150	160
Virginia	123	170	120	100	200
Kentucky	186	100	60	70	90
Missouri	166	20	50	40	50
Kansas	94	20	50	30	30
Arizona	56	20	10	10	10
8 INTERMEDIATE	1,226	920	800	720	900
37 LATE AND INTERMEDIATE STATES	**106,155**	**120,670**	**135,880**	**150,590**	**160,650**

1 Merchantable stocks consist of potatoes held by growers, local dealers and buyers on farms or near areas of production for sale or delivery after December 31. They include potatoes held for sale or delivery to starch factories and other processors.

2 Note that the 10-year average figures ("Group" and "all States") are the averages of the yearly totals, not the sum of group or State averages.

3 Revised. 4 Preliminary.

POTATOES (IRISH): PRODUCTION AND FARM DISPOSITION IN THE 37 LATE AND INTERMEDIATE STATES CROP OF 1949 (Revised)

GROUP AND STATE	Production[1]	FARM DISPOSITION: Fed to livestock, shrinkage, and loss after harvest	For farm household use	Used for seed on farms where grown	Sold: Quantity[2]	Sold: Percent of crop
	Thousand bushels					Percent
SURPLUS LATE STATES:						
Maine	70,215	4,286	578	2,210	63,141	90
New York	30,660	1,526	1,666	982	26,486	86
Pennsylvania	19,158	1,533	1,891	645	15,089	79
Michigan	17,160	2,402	1,824	1,301	11,633	68
Wisconsin	13,600	1,564	2,030	716	9,290	68
Minnesota	17,000	1,530	1,680	816	12,974	76
North Dakota	21,645	1,299	884	1,231	18,231	84
South Dakota	1,260	82	285	80	813	65
Nebraska	8,840	575	988	382	6,895	78
Montana	2,325	256	238	148	1,683	72
Idaho	36,000	3,780	264	1,901	30,055	83
Wyoming	1,870	272	34	109	1,455	78
Colorado	18,810	2,163	180	1,123	15,344	82
Utah	3,388	355	113	142	2,778	82
Nevada	396	48	18	28	302	76
Washington	10,080	806	235	144	8,895	88
Oregon	11,890	1,605	147	521	9,617	81
California (Late)	15,750	708	58	315	14,669	93
18 SURPLUS LATE	300,047	24,790	13,113	12,794	249,350	83.1
OTHER LATE STATES:						
New Hampshire	968	48	183	14	723	75
Vermont	1,128	68	304	77	679	60
Massachusetts	2,850	114	291	12	2,433	85
Rhode Island	1,160	52	31	3	1,074	93
Connecticut	3,013	166	174	8	2,665	88
West Virginia	2,090	261	1,398	106	325	16
Ohio	6,270	345	1,456	142	4,327	69
Indiana	3,900	195	930	103	2,672	69
Illinois	1,000	95	648	30	227	23
Iowa	1,100	83	570	40	407	37
New Mexico	246	24	16	11	195	79
11 OTHER LATE	23,725	1,451	6,001	546	15,727	66.3
29 LATE STATES	323,772	26,241	19,114	13,340	265,077	81.9
INTERMEDIATE STATES:						
New Jersey	8,554	299	100	116	8,039	94
Delaware	490	30	75	11	374	76
Maryland	1,587	104	392	58	1,033	65
Virginia	9,126	320	1,584	164	7,058	77
Kentucky	2,730	218	1,680	117	715	26
Missouri	2,432	170	1,615	20	627	26
Kansas	1,114	128	405	19	562	50
Arizona	1,268	51	10	5	1,202	95
8 INTERMEDIATE	27,301	1,320	5,861	510	19,610	71.8
37 LATE AND INTERMEDIATE STATES	**351,073**	**27,561**	**24,975**	**13,850**	**284,687**	**81.1**

[1] Production is for the total crop grown in each State except California where only the late crop is shown.

[2] Consists of potatoes sold for food, seed, feed, processing and all *purchases* by the Government under price support program.

FARM STYLE FRIED POTATOES

Peel potatoes and slice thin. For each 2 cups of slices allow a tablespoon of meat drippings. Place in a frying pan with a little cold water. Sprinkle with salt. Cover and cook 10 to 15 minutes. Steam from the water will cook the potatoes. When they begin to brown, turn them with a spatula. They burn easily. Onions to taste (1 to 4 tablespoons) may be sliced along with the potatoes.

POTATO CHIPS ARE POPULAR

People who buy potato chips usually buy them for snacks, parties, and picnics. Nearly 9 out of 10 of the families interviewed use potato chips. Southerners usually buy them in 5 and 10-cent bags. Northerners are likely to buy them in 15 to 25-cent bags.

POTATOES (IRISH): PRODUCTION AND FARM DISPOSITION IN THE 37 LATE AND INTERMEDIATE STATES CROP OF 1950 (Preliminary)

GROUP AND STATE	Production[1]	INDICATED FARM DISPOSITION: Fed and to be fed to livestock, shrinkage, and loss after harvest	Used and saved for farm household use	Saved for seed on farms where grown	Sold and for sale: Quantity[2]	Sold and for sale: Percent of crop
SURPLUS LATE STATES:			Thousand bushels			Percent
Maine	61,750	3,397	540	2,192	55,621	90
New York	34,315	1,973	1,647	899	29,796	87
Pennsylvania	18,525	1,575	1,650	821	14,479	78
Michigan	17,460	2,270	1,600	1,375	12,215	70
Wisconsin	15,015	1,727	2,077	658	10,553	70
Minnesota	17,640	1,587	1,680	915	13,458	76
North Dakota	22,230	1,667	924	1,297	18,342	83
South Dakota	2,250	180	432	133	1,505	67
Nebraska	[3] 11,700	[3] 994	950	359	9,397	80
Montana	2,590	350	264	137	1,839	71
Idaho	46,610	3,728	276	1,621	40,985	88
Wyoming	2,152	334	38	84	1,696	79
Colorado	18,600	1,953	151	857	15,639	84
Utah	3,335	367	99	130	2,739	82
Nevada	468	65	21	24	358	76
Washington	11,780	706	255	128	10,691	91
Oregon	13,200	1,452	175	475	11,098	84
California (Late)	16,875	' 844	64	200	15,767	93
18 SURPLUS LATE	316,495	25,169	12,843	12,305	266,178	84.1
OTHER LATE STATES:						
New Hampshire	980	53	155	17	755	77
Vermont	1,092	40	274	83	686	63
Massachusetts	2,816	98	252	13	2,453	87
Rhode Island	1,275	51	25	4	1,195	94
Connecticut	3,481	157	145	18	3,161	91
West Virginia	1,980	208	1,364	100	308	16
Ohio	7,600	570	1,458	141	5,431	71
Indiana	4,845	218	914	80	3,633	75
Illinois	882	79	570	35	198	22
Iowa	1,300	104	595	62	539	41
New Mexico	240	20	17	8	195	81
11 OTHER LATE	26,491	1,607	5,769	561	18,554	70.0
29 LATE STATES	342,986	26,776	18,612	12,866	284,732	83.0
INTERMEDIATE STATES:						
New Jersey	12,980	519	92	116	12,253	94
Delaware	628	32	69	7	520	83
Maryland	1,664	100	350	60	1,154	69
Virginia	9,405	376	1,628	140	7,261	77
Kentucky	2,418	242	1,500	73	603	25
Missouri	2,346	117	1,404	19	806	34
Kansas	1,060	84	375	19	582	55
Arizona	1,704	94	10	4	1,596	94
8 INTERMEDIATE	32,205	1,564	5,428	438	24,775	76.9
37 LATE AND INTERMEDIATE STATES	**375,191**	**28,340**	**24,040**	**13,304**	**309,507**	**82.5**

1 Production is for the total crop grown in each State except California where only the late crop is shown.

2 Consists of potatoes sold and to be sold for food, seed, feed, processing and all *purchases* by the Government under price support program.

3 Includes an estimated 65,000 bushels of the *commercial early* crop not marketed on account of economic conditions.

MASHED POTATO PATTIES

Use cold mashed potatoes: Shape them into small cakes, roll them in flour, and fry them golden brown in a little fat. For variety, add to the mashed potatoes chopped meat, or fish, or grated cheese.

BAKED POTATO SLICES

Use large round potatoes. Scrub them. Without peeling them cut them in ½-inch slices. Bake them in a moderate oven (375° F.) until they are done. Serve with butter, salt, and pepper.

POTATOES: ACREAGE HARVESTED, YIELD PER ACRE AND PRODUCTION IN THE UNITED STATES, CROP OF 1949 WITH COMPARISONS[1]

The upward trend in potato yields continued during 1950 and, despite the lowest acreage since 1876, a crop of about 100 million bushels more than National requirements was produced. Estimated production of 439,500,000 bushels exceeds last year's crop by 7 per cent and is 9 per cent above average. This year's crop has been exceeded only by the 1948, 1946 and 1943 productions. Growers planted 1,866,000 acres to potatoes, compared with 1949 plantings of 1,934,000 acres and the 1939-48 average of 2,718,000 acres. The estimated 1,847,000 acres harvested are 3 per cent smaller than last year's acreage and slightly more than two-thirds of average. Even though prices to growers were disappointingly low at harvest, the acreage that was not dug because of low prices is insignificant. Yields were excellent in practically all areas and the national average of 238 bushels exceeds the previous record high yield per acre by 22 bushels.

Group and State	Average harvested			Yield per acre			Production		
	Average 1939-48	1949	1950	Average 1939-48	1949	1950	Average 1939-48	1949	1950
	Thousand acres			Bushels			Thousand bushels		
SURPLUS LATE POTATO STATES:									
Maine	182	151	130	305	465	475	56,252	70,215	61,750
New York, Long Island	61	54	47	257	230	365	15,805	12,420	17,155
New York, Up-State	122	76	66	136	240	260	15,881	18,240	17,160
Pennsylvania	146	103	95	135	186	195	19,224	19,158	18,525
3 EASTERN	511	384	338	211.9	312.6	339.0	107,161	120,033	114,590
Michigan	172	104	97	108	165	180	18,136	17,160	17,460
Wisconsin	142	80	77	95	170	195	12,894	13,600	15,015
Minnesota	183	100	98	105	170	180	18,349	17,000	17,640
North Dakota	151	117	117	125	185	190	18,665	21,645	22,230
South Dakota	30	18	15	85	70	150	2,519	1,260	2,250
5 CENTRAL	677	419	404	107.5	168.7	184.6	70,564	70,665	74,595
Nebraska	71	52	52	154	170	225	10,731	8,840	[2] 11,700
Montana	16	15	14	124	155	185	1,996	2,325	2,590
Idaho	153	144	158	239	250	295	36,548	36,000	46,610
Wyoming	13.4	11.0	10.5	167	170	205	2,204	1,870	2,152
Colorado	78	66	62	212	285	300	16,618	18,810	18,600
Utah	15.1	15.4	14.5	177	220	230	2,672	3,388	3,335
Nevada	2.6	1.8	1.8	196	220	260	518	396	468
Washington	38	36	38	236	280	310	8,953	10,080	11,780
Oregon	42	41	40	239	290	330	10,164	11,890	13,200
California [1]	37	45	45	321	350	375	11,997	15,750	16,875
10 WESTERN	466.3	427.2	435.8	219.7	256.0	292.1	102,401	109,349	127,310
TOTAL 18	1,654.8	1,230.2	1,117.8	172.0	243.9	268.7	280,126	300,047	316,495
OTHER LATE POTATO STATES:									
New Hampshire	6.7	4.3	4.0	169	225	245	1,108	968	980
Vermont	10.6	6.1	5.6	142	185	195	1,479	1,128	1,092
Massachusetts	19.6	13.9	13.1	164	205	215	3,163	2,850	2,816
Rhode Island	6.0	5.8	5.0	206	200	255	1,231	1,160	1,275
Connecticut	17.3	13.1	11.8	201	230	295	3,431	3,013	3,481
West Virginia	30	19	18	102	110	110	3,015	2,090	1,980
Ohio	72	38	38	119	165	200	8,174	6,270	7,600
Indiana	38	20	19	129	195	255	4,640	3,900	4,845
Illinois	26	10	9	88	100	98	2,214	1,000	882
Iowa	36	11	10	99	100	130	3,637	1,100	1,300
New Mexico	3.5	3.0	3.0	80	82	80	279	246	240
TOTAL 11	264.3	144.2	136.5	126.3	164.5	194.1	32,370	23,725	26,491
29 LATE STATES	1,919.1	1,374.4	1,314.3	166.1	235.6	261.0	312,497	323,772	342,986

(Continued on Page 53)

POTATOES: ACREAGE HARVESTED, YIELD PER ACRE AND PRODUCTION IN THE UNITED STATES, CROP OF 1949 WITH COMPARISONS[1] (Continued)

Group and State	Acreage harvested Average 1939-48	1949	1950	Yield per acre Average 1939-48	1949	1950	Production Average 1939-48	1949	1950
	Thousand acres			Bushels			Thousand bushels		
INTERMEDIATE POTATO STATES:									
New Jersey	62	47	44	182	182	295	11,142	8,554	12,980
Delaware	3.8	3.5	4.0	87	140	157	325	490	628
Maryland	18.0	13.8	12.9	111	115	129	1,957	1,587	1,664
Virginia	71	54	55	127	169	171	8,883	9,126	9,405
Kentucky	41	30	26	89	91	93	3,616	2,730	2,418
Missouri	33	19	17	110	128	138	3,597	2,432	2,346
Kansas	21	11.6	10	94	96	106	1,920	1,114	1,060
Arizona	4.4	4.3	4.8	222	295	355	1,072	1,268	1,704
TOTAL 8	252.4	183.2	173.7	130.6	149.0	185.4	32,512	27,301	32,205
37 LATE AND INTERMEDIATE	2,171.5	1,557.6	1,488.0	161.9	225.4	252.1	345,009	351,073	375,191

[1] U.S.D.A., Bureau of Agricultural Economics, Crop Reporting Board.

EARLY POTATO STATES:									
North Carolina	82	63	64	114	129	162	9,302	8,127	10,368
South Carolina	24	15	17	107	110	104	2,563	1,650	1,768
Georgia	23	18	16	68	72	78	1,541	1,296	1,248
Florida	30.6	23.0	26.1	136	236	217	4,150	5,428	5,664
Tennessee	39	25	22	82	90	100	3,190	2,250	2,200
Alabama	48	33	35	92	104	113	4,318	3,432	3,955
Mississippi	24	16	15	68	70	69	1,658	1,120	1,035
Arkansas	39	26	23	82	80	81	3,192	2,080	1,863
Louisiana	42	21	21	58	59	66	2,446	1,239	1,386
Oklahoma	24	11	10	68	74	87	1,654	814	870
Texas	51	38	32	89	97	86	4,560	3,686	2,752
California [1]	55	66	78	346	445	400	19,701	29,370	[2] 31,200
TOTAL 12	482.7	355.0	359.1	122.4	170.4	179.1	58,275	60,492	64,309
TOTAL U. S.	2,654.2	1,912.6	1,847.1	154.6	215.2	237.9	403,284	411,565	439,500

[1] Early and late crops shown separately for California; combined for all other States.

[2] Includes the following quantities of commercial early potatoes not marketed (1,000 bushels): Nebraska, 65; California, 1,170.

Potato Ring-Rot Organisms Hide in Burlap Sacks

Potato ring-rot organisms apparently find their best hiding places on burlap surfaces, but will also live on wood and metal surfaces for a limited amount of time, according to a release from the Wyoming experiment station.

G. H. Starr, plant pathologist at the station, said, in a report of ring-rot studies, that it appears that ring-rot bacteria can live longer on burlap than on either wood or metal, and longer on wood than on metal.

Ring-rot bacteria survived a five-month period in a storage cellar when kept on a burlap surface, according to Starr. The organisms also survived a five-month period on wood and a three-month period on metal under the same conditions.

When the ring-rot bacteria were placed on burlap outdoors, they survived a three- to four-month period, but failed to survive three months on wood under the same conditions. Placed outdoors on metal, they survived only two months.—M. R. HAAG.

1950 PRODUCTION OF CERTIFIED SEED POTATOES LARGEST ON RECORD

Reports from certifying officials in 27 States, mostly in the northern half of the country where the bulk of the seed potatoes are grown, show that 50,527,308 bushels of certified seed potatoes were produced in 1950. This is the largest crop of seed potatoes ever harvested, and represents 11.5 per cent of all Irish potatoes produced. The 1950 production is 5 per cent larger than the 48,252,157 bushels produced in 1949 and 68 per cent above the 1939-48 average of 30,036,528 bushels. The moderately smaller crops harvested in 1950 in the North Atlantic States, which normally produce about one half of the Nation's supply of certified seed potatoes, were more than offset by larger crops in the Western and mid-Western producing areas, especially in Idaho, Oregon, California, Montana, North Dakota, South Dakota, and Minnesota. Sixteen of the 27 States reporting production in both years showed more seed produced in 1950 but 11 reported less.

TABLE 1
CERTIFIED SEED POTATO ACREAGE AND PRODUCTION BY STATES, AVERAGE 1939-48; ANNUAL 1949 AND 1950

State	Acreage Harvested			Production		
	Average 1939-48	1949	1950	Average 1939-48	1949	1950
	Acres			Bushels		
Arizona	[1] 1	0	0	[1] 26	0	0
California	3,534	6,962	7,693	1,380,797	3,137,898	3,675,590
Colorado	3,754	4,440	3,968	1,072,210	1,746,673	1,481,002
Georgia	37	0	0	2,470	0	0
Idaho	5,423	7,740	9,737	756,310	1,471,000	2,523,245
Iowa	[1] 130	219	76	[1] 38,300	24,549	13,200
Kentucky	29	31	31	3,269	6,820	2,270
Louisiana	433	0	0	10,152	0	0
Maine	36,928	45,895	41,526	13,191,063	23,371,494	22,059,803
Maryland	195	75	102	30,036	23,715	29,960
Michigan	2,599	2,136	2,425	405,415	415,729	481,021
Minnesota	18,337	22,456	26,348	3,196,387	5,113,671	5,323,458
Montana	1,430	2,110	2,385	327,240	541,755	785,995
Nebraska	7,623	6,313	5,615	822,118	794,449	724,655
New Hampshire	111	28	56	36,674	16,150	28,300
New Jersey	375	140	253	59,723	30,865	55,794
New Mexico	9	9	0	1,898	6,200	0
New York	3,009	4,204	3,360	999,200	1,750,571	1,599,290
North Carolina	129	255	312	22,264	66,452	62,400
North Dakota	29,593	22,271	26,270	4,417,799	5,303,000	6,430,350
Ohio	1	0	0	280	0	0
Oregon	2,564	3,035	3,352	708,978	804,485	1,403,770
Pennsylvania	963	1,410	1,168	279,218	525,168	470,995
South Dakota	3,996	2,524	2,953	672,046	347,310	594,895
Tennessee	301	254	330	45,588	87,700	112,145
Utah	511	695	708	131,427	237,394	320,930
Vermont	394	575	498	124,951	312,010	321,582
Virginia	3	0	4	212	0	130
Washington	1,835	1,383	1,437	337,569	181,735	275,415
Wisconsin	2,683	5,303	4,798	644,989	1,776,900	1,651,750
Wyoming	2,227	930	559	342,557	158,464	99,363
TOTAL	128,554	141,393	145,864	30,036,528	48,252,157	50,527,308

[1] Short-time average.

United States Department of Agriculture, Bureau of Agricultural Economics, Washington, D. C., January, 1951.

TABLE 2
PRODUCTION OF CERTIFIED SEED POTATOES BY VARIETIES

State	Average 1944-48	1947	1948	1949	1950
	Bushels	Bushels	Bushels	Bushels	Bushels
COBBLER					
California	0	0	0	0	0
Colorado	181,467	127,845	135,530	113,800	93,136
Idaho	67	0	0	0	0
Iowa	11,700	58,500	0	15,455	10,000
Kentucky	1,702	680	673	2,440	63
Maine	3,712,445	3,925,290	2,510,128	1,473,654	1,827,182
Maryland	21,128	18,000	6,075	11,200	10,650
Michigan	8,867	7,980	2,870	11,522	14,834
Minnesota	2,653,872	3,413,255	2,832,132	2,696,870	2,977,024
Montana	370	0	600	1,250	1,400
Nebraska	2,294	206	2,078	81	103
New Hampshire	188	750	0	0	0
New Jersey	2,971	6,294	495	804	6,162
New York	49,743	28,400	65,600	59,312	60,080
North Dakota	2,299,668	2,186,480	1,500,000	850,000	1,200,000
Oregon	257	125	1,000	1,325	1,000
Pennsylvania	2,087	0	0	335	3,028
South Dakota	235,756	231,825	275,310	48,800	71,200
Tennessee	180	0	0	0	0
Utah	1,356	333	667	0	0
Vermont	15	0	0	0	3,025
Washington	1,261	0	3,333	625	235
Wisconsin	159,600	252,000	170,000	150,000	136,000
Wyoming	13,506	12,294	7,507	9,267	50
TOTAL	9,360,499	10,270,257	7,513,998	5,446,740	6,415,262
TRIUMPH					
California	2,007	400	1,500	3,663	0
Colorado	315,331	364,645	452,045	452,150	365,219
Georgia	600	0	0	0	0
Idaho	9,961	13,000	3,150	715	9,000
Kentucky	14	30	42	0	0
Maine	68,543	82,971	42,735	32,957	55,481
Maryland	25	31	25	0	0
Minnesota	678,576	479,060	790,320	981,414	777,219
Montana	88,639	96,815	152,824	91,861	82,870
Nebraska	851,723	642,075	720,298	697,033	618,278
New Jersey	0	0	0	0	50
New York	1,482	0	1,312	3,124	5,140
North Dakota	2,749,548	3,034,000	3,100,000	2,600,000	2,700,000
Oregon	2,822	4,000	1,311	250	1,750
South Dakota	620,901	516,900	702,260	238,140	326,800
Tennessee	37,747	48,000	44,400	72,850	76,500
Utah	13,246	300	1,508	857	3,700
Washington	1,838	350	875	500	117
Wisconsin	176,000	230,000	300,000	325,000	151,000
Wyoming	290,187	258,945	150,510	127,236	78,820
TOTAL	5,909,190	5,771,522	6,465,115	5,627,750	5,251,944
RUSSET RURAL					
Colorado	12,241	12,690	6,790	13,000	27,652
Iowa	220	1,100	0	0	0
Maine	67,298	62,370	87,072	39,203	69,069
Maryland	140	500	0	0	0
Michigan	308,568	271,519	200,017	182,982	179,820
Nebraska	5,935	1,066	2,525	0	732
New York	25,652	29,100	39,245	30,520	76,887
Pennsylvania	67,394	63,975	40,332	10,850	0
South Dakota	44	0	0	0	0
Wisconsin	104,740	185,000	113,700	100,000	155,000
Wyoming	3,953	0	0	0	0
TOTAL	596,185	627,320	489,681	376,555	509,160
RURAL NEW YORKER (ALSO CALLED WHITE RURAL OR SMOOTH RURAL)					
Colorado	15,066	10,755	10,850	23,555	23,263
Maryland	69	100	200	150	100
Michigan	4,341	4,507	5,141	8,854	14,671
Minnesota	40	0	0	0	0
New York	13,714	9,100	17,020	13,820	26,446
Pennsylvania	6,557	0	1,064	0	25,938
Utah	26	0	0	0	0
Wisconsin	4,610	6,000	7,750	14,000	18,000
TOTAL	44,422	30,462	42,025	60,379	108,418

(Continued on Page 56)

TABLE 2 (Continued)
PRODUCTION OF CERTIFIED SEED POTATOES

State	Average 1944-48	1947	1948	1949	1950
	Bushels	Bushels	Bushels	Bushels	Bushels
			KATAHDIN		
Colorado	52,206	59,965	57,260	44,610	86,510
Idaho	146	0	0	0	0
Iowa	0	0	0	0	600
Kentucky	306	0	0	0	0
Maine	7,395,053	10,143,821	11,974,306	14,245,924	14,819,479
Maryland	294	62	1,075	975	0
Michigan	20,573	29,142	52,910	81,314	81,558
Minnesota	52,076	27,200	31,950	29,904	42,187
Nebraska	7,267	2,633	3,503	122	0
New Hampshire	3,955	5,020	5,170	2,250	4,000
New Jersey	23,307	15,827	25,883	19,178	37,260
New York	612,633	690,000	886,965	990,045	859,172
North Carolina	25	0	125	300	0
North Dakota	12,330	1,200	0	2,000	14,000
Oregon	1,665	1,000	4,000	3,200	2,830
Pennsylvania	144,596	163,996	150,409	125,023	216,771
South Dakota	215	0	0	0	0
Tennessee	160	0	800	350	18,750
Utah	295	133	0	0	0
Vermont	52,748	56,087	68,875	141,680	128,220
Virginia	0	0	0	0	40
Washington	2,513	4,666	2,700	1,600	0
Wisconsin	100,400	92,000	138,000	170,000	150,000
Wyoming	88	0	0	0	0
TOTAL	8,482,850	11,292,752	13,403,931	15,858,475	16,461,377
			CHIPPEWA		
Colorado	716	0	0	0	0
Idaho	3,282	3,000	500	700	133
Iowa	560	2,800	0	0	0
Kentucky	54	0	0	0	0
Maine	1,669,322	2,329,594	2,777,681	4,525,865	2,139,712
Maryland	17	0	30	0	0
Michigan	31,694	20,994	18,659	18,983	34,497
Minnesota	69,940	9,234	35,884	69,273	24,187
New Jersey	6,581	5,577	6,260	6,750	9,870
New York	144,196	102,500	131,100	93,094	71,707
North Dakota	45,462	0	7,000	300	6,600
Oregon	183	250	666	2,200	1,500
Pennsylvania	295	0	1,475	0	10,300
South Dakota	2,820	5,100	0	0	0
Tennessee	350	0	0	0	0
Vermont	20	0	0	0	39,062
Wisconsin	313,400	365,000	470,000	470,000	421,000
TOTAL	2,288,893	2,844,049	3,449,255	5,187,165	2,758,568
			WHITE ROSE		
California	1,770,816	2,034,500	2,637,750	2,831,760	2,763,840
Colorado	20,948	22,180	27,100	15,290	8,386
Idaho	13,833	7,500	13,000	28,305	4,550
Minnesota	140,113	149,253	158,745	84,170	45,700
Montana	69,460	56,250	74,375	62,322	86,660
Nebraska	1,890	2,055	2,025	4,105	9,123
New Mexico	760	0	0	3,400	0
North Dakota	168,619	241,000	170,000	160,000	180,000
Oregon	398,655	360,617	537,958	225,000	389,950
South Dakota	2,178	2,100	6,750	0	0
Utah	130,983	214,988	182,576	170,833	247,820
Washington	258,063	338,666	170,000	134,660	152,000
Wisconsin	2,095	500	900	1,200	2,450
Wyoming	2,914	4,060	10,431	7,841	2,746
TOTAL	2,981,328	3,433,669	3,991,610	3,728,886	3,893,225

(Continued on Page 57)

TABLE 2 (Continued)
PRODUCTION OF CERTIFIED SEED POTATOES

State	Average 1944-48	1947	1948	1949	1950
	Bushels	Bushels	Bushels	Bushels	Bushels
SEBAGO					
California	2,000	0	10,000	0	0
Colorado	992	0	0	0	0
Iowa	1,540	7,700	0	4,258	600
Kentucky	152	125	633	1,490	800
Maine	1,046,656	798,416	991,700	485,906	222,995
Maryland	398	250	975	7,000	13,050
Michigan	28,096	43,328	35,733	43,669	108,378
Minnesota	44,427	30,297	70,650	38,911	49,446
Montana	647	3,000	0	0	0
Nebraska	1,658	2,406	5,883	0	0
New Hampshire	602	800	1,050	0	0
New Jersey	651	0	135	0	0
New York	176,340	133,700	197,600	133,263	208,625
North Dakota	10,642	13,200	2,400	0	0
Oregon	67	0	333	210	500
Pennsylvania	34,586	23,703	23,587	25,980	6,753
South Dakota	10,060	14,900	0	0	2,150
Vermont	550	0	0	0	0
Virginia	60	0	0	0	0
Washington	5,710	6,600	6,666	2,800	1,333
Wisconsin	125,400	180,000	170,000	193,000	196,000
TOTAL	1,491,233	1,258,425	1,517,345	936,487	810,630
GREEN MOUNTAIN					
Maine	3,218,401	3,040,158	3,039,919	2,202,673	1,954,316
Maryland	21	0	0	375	0
Michigan	13,375	18,528	8,000	12,125	10,003
Minnesota	7,050	4,533	2,222	6,337	10,429
New Hampshire	28,139	20,722	32,087	13,500	20,000
New Jersey	379	293	410	0	0
New York	227,589	168,500	135,000	77,045	82,400
Pennsylvania	1,400	0	0	0	13,125
South Dakota	35	0	0	0	0
Tennessee	225	700	250	0	0
Vermont	65,088	58,380	108,833	122,705	111,390
Wisconsin	2,200	0	0	2,400	4,500
TOTAL	3,563,902	3,311,814	3,326,721	2,437,160	2,206,163
EARLY OHIO					
Montana	15	0	75	0	0
Minnesota	129,131	172,353	153,564	76,630	69,176
North Dakota	130,090	323,400	120,000	34,000	35,000
Oregon	0	0	0	150	430
South Dakota	5,082	4,600	10,750	4,960	9,660
Iowa	440	2,200	0	780	1,000
TOTAL	264,758	502,553	284,389	116,520	115,266
BURBANK					
California	35,640	5,200	8,000	500	0
Minnesota	340	0	0	0	0
Oregon	40,680	35,750	34,000	36,500	27,780
Utah	0	0	0	3,166	0
Washington	2,468	3,700	5,776	200	300
TOTAL	79,128	44,650	47,776	40,366	28,080
RUSSET BURBANK (NETTED GEM)					
California	434,097	314,000	516,400	275,250	871,150
Colorado	20,277	13,830	20,070	33,810	112,703
Idaho	1,154,009	860,000	1,391,000	1,441,280	2,509,562
Iowa	0	0	0	1,836	0
Michigan	3,215	6,050	9,025	10,087	4,752
Minnesota	78,631	59,062	249,690	249,404	166,372
Montana	276,708	308,462	370,675	375,835	601,065
North Dakota	4,644	12,000	8,000	39,000	38,000
Oregon	483,679	616,617	697,500	525,000	964,160
Pennsylvania	0	0	0	0	18,155
South Dakota	1,710	1,200	7,350	0	0
Utah	54,439	26,100	91,765	62,538	69,410
Washington	72,767	26,360	64,860	40,000	118,250
Wisconsin	9,080	6,000	32,000	105,000	115,000
Wyoming	2,110	456	7,827	1,687	6,470
TOTAL	2,595,367	2,250,137	3,466,162	3,160,727	5,595,049

(Continued on Page 58)

TABLE 2 (Continued)
PRODUCTION OF CERTIFIED SEED POTATOES

State	Average 1944-48	1947	1948	1949	1950
	Bushels	Bushels	Bushels	Bushels	Bushels
		HOUMA			
Maine	76,268	70,812	53,417	15,964	6,430
Maryland	5	0	0	0	0
New Hampshire	5,882	9,952	12,293	0	2,800
New Jersey	17	0	0	0	0
New York	18,832	21,600	11,180	3,375	23,770
Pennsylvania	2,412	0	0	0	0
Vermont	13,126	15,225	17,500	41,950	15,675
TOTAL	116,542	117,589	94,390	61,289	48,675
		SEQUOIA			
Kentucky	1,330	1,900	1,475	2,890	1,120
Maine	35,790	25,688	40,150	70,723	62,208
Maryland	3,413	75	350	40	50
Michigan	3,348	9,150	8,750	21,018	9,869
Minnesota	13,181	3,240	0	80	87
New Hampshire	20	0	0	0	0
New Jersey	2,092	0	110	1,226	562
New York	17,752	10,100	9,660	20,625	4,770
North Carolina	31,433	23,197	73,250	65,652	34,400
North Dakota	295	1,400	0	0	0
Pennsylvania	4,072	2,800	5,678	0	0
Tennessee	12,277	6,575	24,700	14,500	13,860
Vermont	907	612	500	0	0
Virginia	300	0	0	0	0
Wisconsin	15,180	30,900	13,000	37,000	3,850
TOTAL	141,391	115,637	177,623	233,754	130,776
		PONTIAC			
California	13,627	25,200	11,600	6,600	30,400
Colorado	17,789	25,720	27,340	27,025	25,328
Idaho	360	0	0	0	0
Iowa	200	1,000	0	0	0
Maine	14,466	30,030	19,010	11,417	15,456
Maryland	1,184	3,300	260	100	3,100
Michigan	19,690	2,690	2,380	15,645	9,069
Minnesota	67,142	37,538	92,287	509,171	521,692
Montana	3,463	5,585	3,500	4,712	7,600
Nebraska	0	0	0	7,181	1,406
New Hampshire	120	0	600	400	1,500
New Jersey	20	100	0	0	0
New Mexico	2,400	0	0	2,800	0
New York	10,432	27,200	3,690	22,890	12,190
North Carolina	25	0	125	0	0
North Dakota	216,917	13,200	600,000	550,000	400,000
Oregon	24	100	0	500	1,330
Pennsylvania	0	0	0	1,908	11,298
South Dakota	51,160	44,820	157,050	15,750	158,450
Utah	200	0	0	0	0
Vermont	0	0	0	0	6,600
Washington	0	0	0	0	350
Wisconsin	17,240	36,400	20,000	52,000	72,750
Wyoming	460	0	0	1,472	0
TOTAL	436,919	252,883	937,842	1,229,571	1,278,519
		KASOTA			
Maryland	6	0	30	50	0
Minnesota	1,196	0	0	0	0
Montana	1,854	3,000	5,020	5,775	6,400
Nebraska	10,095	345	953	0	0
North Dakota	40	0	0	0	0
Wyoming	2,413	0	0	0	0
TOTAL	15,604	3,345	6,003	5,825	6,400
		MENOMINEE			
Iowa	180	900	0	0	0
Maryland	128	62	140	0	0
Michigan	19,748	17,034	4,650	6,800	4,420
New York	200	0	0	0	0
North Dakota	3,542	0	0	0	0
Pennsylvania	2,136	0	0	0	0
Tennessee	910	0	0	0	0
Wisconsin	1,450	4,000	3,250	2,200	0
TOTAL	28,294	21,996	8,040	9,000	4,420

(Continued on Page 59)

TABLE 2 (Continued)
PRODUCTION OF CERTIFIED SEED POTATOES

State	Average 1944-48	1947	1948	1949	1950
	Bushels	Bushels	Bushels	Bushels	Bushels
WARBA					
Kentucky	51	0	0	0	0
Maine	8,438	3,416	6,584	4,177	4,333
Maryland	19	25	0	0	0
Minnesota	40,663	58,675	25,400	29,112	2,371
Montana	390	0	0	0	0
New Hampshire	20	0	0	0	0
New York	1,000	0	0	438	143
North Dakota	20,062	36,600	3,200	3,000	6,400
South Dakota	730	1,900	1,750	0	0
TOTAL	71,373	100,616	36,934	36,727	13,247
RED WARBA					
Colorado	14,520	24,550	40,330	0	0
Iowa	480	2,400	0	2,220	1,000
Maryland	6	0	0	0	0
Minnesota	131,593	146,070	183,752	122,343	125,351
Nebraska	22,741	24,813	29,951	16,785	7,922
North Dakota	135,333	284,600	156,000	120,000	200,000
South Dakota	24,704	41,920	40,250	39,300	5,160
Wisconsin	21,030	9,500	41,650	20,000	35,000
Wyoming	13,411	12,694	1,272	0	0
TOTAL	363,818	546,547	493,205	320,648	374,433

(Continued on Page 60)

Table 2 (Continued)
PRODUCTION OF CERTIFIED SEED POTATOES

State	Average 1944-48	1947	1948	1949	1950
	Bushels	Bushels	Bushels	Bushels	Bushels
RED McCLURE					
Colorado	736,425	851,705	1,029,900	1,014,263	738,805
Wisconsin	0	0	0	0	4,500
Wyoming	537	286	0	0	0
TOTAL	736,962	851,991	1,029,900	1,014,263	743,305
RED PONTIAC (Dakota Chief)					
Maryland	8	0	40	0	0
Minnesota	5,491	0	27,454	144,184	421,236
Nebraska	0	0	0	0	3,405
North Dakota	99,760	28,800	470,000	900,000	1,500,000
South Dakota	0	0	0	0	21,050
Wisconsin	0	0	0	900	22,500
Wyoming	0	0	0	3,015	1,677
TOTAL	105,259	28,800	497,494	1,048,099	1,969,868
CALROSE					
California	226,207	362,100	380,600	18,000	4,200
Maryland	20	50	50	100	0
Oregon	350	1,750	0	0	80
Washington	6,359	0	31,797	0	0
TOTAL	232,936	363,900	412,447	18,100	4,280
TETON					
Maine	803	280	3,734	19,943	89,971
Maryland	17	44	40	0	35
Michigan	30	0	150	0	0
Minnesota	17	85	0	630	1,230
Nebraska	0	0	0	0	758
New York	1,540	7,700	0	0	0
Pennsylvania	55,739	55,236	216,265	322,822	145,425
Vermont	80	0	400	5,175	17,050
Wyoming	2,227	6,090	25	215	1,625
TOTAL	60,453	69,435	220,614	348,785	256,094
MOHAWK					
Maine	32,448	40,092	94,201	180,976	93,319
Minnesota	115	400	0	0	0
New Jersey	39	30	165	425	0
New York	1,106	0	0	6,750	1,430
New Hampshire	88	0	0	0	0
TOTAL	33,796	40,522	94,366	188,151	94,749
KENNEBEC					
Maine	0	0	0	20,168	448,372
Maryland	40	0	200	850	450
Minnesota	0	0	0	0	15,448
New York	0	0	0	692	44,242
North Carolina	0	0	0	0	200
North Dakota	0	0	0	3,000	24,000
Oregon	0	0	0	0	660
Pennsylvania	0	0	0	0	3,649
South Dakota	0	0	0	0	20
Tennessee	0	0	0	0	955
Vermont	0	0	0	0	560
Virginia	0	0	0	0	90
TOTAL	40	0	200	24,710	538,646
ONTARIO					
Maine	332	0	1,660	38,274	196,243
Maryland	0	0	0	435	150
Michigan	0	0	0	0	9,150
Nebraska	0	0	0	0	2,415
New York	20,524	18,600	67,320	139,040	62,010
North Dakota	0	0	0	0	20,000
Pennsylvania	280	0	1,400	3,411	2,071
Vermont	64	0	320	500	0
Wisconsin	1,540	0	7,700	70,000	100,000
TOTAL	22,740	18,600	78,400	251,660	392,039

(Continued on Page 61)

TABLE 2 (Continued)
PRODUCTION OF CERTIFIED SEED POTATOES

State	Average 1944-48	1947	1948	1949	1950
	Bushels	Bushels	Bushels	Bushels	Bushels
ESSEX					
Kentucky	0	0	0	0	28
Maine	0	0	0	3,316	55,237
Maryland	0	0	0	250	350
Michigan	0	0	0	2,000	0
Minnesota	0	0	0	0	5,628
New York	6,516	3,600	28,980	151,065	48,595
North Carolina	5	0	25	500	27,800
North Dakota	0	0	0	12,000	80,000
Pennsylvania	522	0	2,612	20,762	14,077
Tennessee	0	0	0	0	2,080
TOTAL	7,043	3,600	31,617	189,893	233,795
PROGRESS					
Maryland	0	0	0	0	25
Nebraska	3,944	0	19,718	67,751	62,825
Wyoming	0	0	0	7,570	7,269
TOTAL	3,944	0	19,718	75,321	70,119
WASECA					
Minnesota	1,842	0	9,212	15,606	39,121
North Dakota	0	0	0	0	1,600
TOTAL	1,842	0	9,212	15,606	40,721
SATAPA					
Minnesota	2,044	3,125	7,097	19,656	25,384
South Dakota	0	0	0	360	0
TOTAL	2,044	3,125	7,097	20,016	25,384
EARLIEST OF ALL					
Oregon	3,056	5,483	7,000	5,000	3,460
Washington	467	1,400	0	0	0
TOTAL	3,523	6,883	7,000	5,000	3,460
RUSSET SEBAGO					
Wisconsin	4,920	6,000	17,400	64,200	60,000
CHENANGO					
Kentucky	0	0	0	0	131
New York	504	0	2,520	1,760	5,946
Pennsylvania	0	0	0	577	7
TOTAL	504	0	2,520	2,337	6,077
CANUS					
North Dakota	500	0	2,500	7,200	0
South Dakota	0	0	0	0	315
TOTAL	500	0	2,500	7,200	315
EARLY ROSE					
Maine	0	0	0	57	0
Oregon	817	433	1,375	1,900	6,330
Vermont	130	0	0	0	0
Washington	263	400	267	450	2,200
TOTAL	1,210	833	1,642	2,407	8,530
BRITISH QUEEN					
California	2,590	1,600	600	1,000	2,000
Oregon	1,867	8,000	1,250	1,200	1,100
TOTAL	4,457	9,600	1,850	2,200	3,100

(Continued on Page 62)

TABLE 2 (Continued)
PRODUCTION OF CERTIFIED SEED POTATOES

State	Average 1944-48	1947	1948	1949	1950
	Bushels	Bushels	Bushels	Bushels	Bushels
DAKOTA RED (Jersey Redskin)					
Maryland	1,275	812	130	0	0
New Jersey	1,063	0	0	1,602	1,890
TOTAL	2,338	812	130	1,602	1,890
WHITE CLOUD					
Maryland	0	0	0	0	25
Nebraska	0	0	0	855	9,123
TOTAL	0	0	0	855	9,148
YAMPA					
Maryland	0	0	0	0	250
Nebraska	0	0	0	536	4,522
Wyoming	0	0	0	161	706
TOTAL	0	0	0	697	5,478
BEAUTY OF HEBRON					
Oregon	100	0	500	850	580
Washington	408	933	467	400	500
TOTAL	508	933	967	1,250	1,080
LA SODA					
Maryland	0	0	0	0	50
Nebraska	0	0	0	0	4,043
TOTAL	0	0	0	0	4,093
GOLD COIN					
Oregon	635	933	1,000	1,200	330
Washington	663	533	833	500	130
TOTAL	1,298	1,466	1,833	1,700	460
ASHWORTH					
Kentucky	0	0	0	0	128
New York	12	0	0	1,925	0
TOTAL	12	0	0	1,925	128
MADISON					
Maryland	0	0	0	0	25
New York	0	0	0	788	4,770
TOTAL	0	0	0	788	4,795
CHISAGO					
Minnesota	545	0	2,727	0	4,170
SNOWDRIFT					
New York	0	0	0	300	52
Pennsylvania	0	0	0	0	375
TOTAL	0	0	0	300	427
MARYGOLD					
Maryland	250	612	640	600	375

(Continued on Page 63)

TABLE 2 (Continued)
PRODUCTION OF CERTIFIED SEED POTATOES

State	Average 1944-48	1947	1948	1949	1950
	Bushels	Bushels	Bushels	Bushels	Bushels
WHITE PONTIAC					
Maryland	8	0	40	120	350
PAWNEE					
Colorado	4,447	4,200	15,975	5,210	0
Maine	654	209	3,062	0	0
Maryland	22	31	0	0	0
New Jersey	917	1,568	2,236	880	0
Utah	29	0	0	0	0
TOTAL	6,070	6,008	21,273	6,090	0
BROWN BEAUTY					
Colorado	6,796	5,160	20,070	3,960	0
ERIE					
Michigan	8,293	11,575	1,820	730	0
New York	11,120	37,600	0	0	0
North Dakota	40	0	0	0	0
Ohio	460	0	0	0	0
Pennsylvania	3,119	1,355	14,238	13,500	0
Wisconsin	100	0	0	0	0
TOTAL	23,132	50,530	16,058	14,230	0

(Continued on Page 64)

TABLE 2 (Continued)
PRODUCTION OF CERTIFIED SEED POTATOES

State	Average 1944-48	1947	1948	1949	1950
	Bushels	Bushels	Bushels	Bushels	Bushels
COLUMBIA RUSSET					
North Dakota	5,280	0	25,000	0	0
LA SALLE					
North Dakota	4,000	0	20,000	0	0
South Dakota	3,216	6,930	3,750	0	0
TOTAL	7,216	6,930	23,750	0	0
PLACID					
New York	408	900	0	0	720
CANOGA					
New York	0	0	0	0	195
PUNGO					
Maryland	0	0	0	0	50
CAYUGA					
North Dakota	0	0	0	20,000	0
EMPIRE					
Maryland	30	50	100	0	0
New York	592	1,700	500	760	0
TOTAL	622	1,750	600	700	0
HARMONY BEAUTY					
Maine	0	0	0	297	0
POTOMAC					
Maryland	553	50	150	60	0
Pennsylvania	27	0	0	0	0
TOTAL	580	50	150	60	0
SIR WALTER RALEIGH					
Pennsylvania	407	0	2,034	0	0
IDAHO RURAL					
Idaho	1,641	50	270	0	0
EPICURE					
Oregon	5	16	0	0	0
MESABA					
Maryland	5	0	0	0	0
Minnesota	4,037	0	0	0	0
TOTAL	4,042	0	0	0	0
EARLAINE					
Maine	19,060	0	0	0	0
New York	760	0	0	0	0
Tennessee	110	0	0	0	0
TOTAL	19,930	0	0	0	0
VARIETIES NOT CLASSIFIED					
California	0	0	0	1,125	4,000
Maine	2,960	0	0	0	0
Maryland	768	0	205	1,410	825
Minnesota	3,104	0	15,521	39,976	0
Montana	50	0	0	0	0
North Dakota	13,891	2,800	0	2,500	18,750
Wisconsin	0	0	0	0	4,200
TOTAL	20,773	2,800	15,726	45,011	27,775

NATIONAL POTATO COUNCIL

POTATO FARMERS, for the first time, have in the National Potato Council a commodity organization of their own.

The National Potato Council was organized in May, 1948, and opened its Washington office in March, 1949.

The Council has three major objectives (1) to promote the greater consumption of Irish potatoes; (2) to strengthen public good will damaged in recent years by propaganda directed against the industry; and (3) to represent potato farmers on policy matters affecting their crop.

Other commodities, such as milk, cotton, wheat and wool, have had their own national organizations for a number of years. These commodity organizations have been very effective in representing producers on a national basis.

The Council represents most of the commercial production of Irish potatoes in the United States. Every major commercial potato growing area is represented on its Board of Directors.

Officers of the National Potato Council are: E. J. Peters, Wasco, California, President; Sol Lavitt, Ellington, Connecticut, Vice President; Clifford G. McIntire, Presque Isle, Maine, Secretary; Robert I. Aten, Macungie, Pennsylvania, Treasurer.

The Council maintains headquarters at 930 F Street, N.W., Washington, D. C., with Whitney Tharin as Executive Secretary.

The four officers and the following 15 men are full members of the Council's Board of Directors, with power to vote: Jack B. Bishop, Wayland, N. Y.; John C. Broome, Aurora, N. C.; W. B. Camp, Bakersfield, Calif.; W. M. Case, Grand Forks, N. Dak.; A. W. Clinger, Shelley, Idaho; Amherst W. Davis, Riverhead, N. Y.; William B. Duryee, Allentown, N. J.; Emil W. Heck, Lawrence, Kans.; Howard S. Hough, Hastings, Fla.; Louie Lyon, Malin, Ore.; W. J. Prosser, Antigo, Wisc.; Jack Renfro, Hereford, Tex.; W. B. Nock, Snow Hill, Md.; Harry E. Umphrey, Presque Isle, Me.; S. A. Wathen, Fort Fairfield, Me.

The following 24 men serve as Directors-at-Large, without a vote on the Board: Sam Anderson, Tulelake, Calif.; L. L. Branthoover, Idaho Falls, Idaho; Dr. E. W. Cake, Norfolk, Va.; L. J. Crescio, Chicago, Ill.; J. Abney Cox, Princeton, Fla.; W. C. Cullen, Jr., Painter, Va.; H. J. Evans, Georgetown, N. Y.; C. L. Fitch, Ames, Iowa; H. F. Ferebee, Camden, N. C.; A. K. Gardner, Augusta, Me.; Frank Garrett, Fairhope, Ala.; Fred Hibst, Cadillac, Mich.; A. J. Holland, Freehold, N. J.; J. C. Jacobsen, Jr., Tehachapi, Calif.; David Jones, Jacobstown, N. J.; Marx Koehnke, Alliance, Nebr.; A. L. Lockhart, Mansfield, Ohio; H. C. McPherson, Bridgeton, Pa.; Clarence Neuman, Shafter, Calif.; Fred Ramsey, Yakima, Wash.; Jim Short, Bend, Ore.; Ferris G. Talmage, East Hampton, N. Y.; Frank J. Towles, Meggetts, S. C.; John Zuckerman, Stockton, Calif.

POTATO AREAS OPERATING UNDER A MARKETING AGREEMENT AND ORDER—1951

1. **Order No. 60**—States of Michigan, Wisconsin, Minnesota, North Dakota and in certain counties of Indiana, effective October 29, 1950.
2. **Order No. 79**—Eastern South Dakota, effective May 15, 1948.
3. **Order No. 81**—Southeastern States; North Carolina, South Carolina and Virginia (not in operation for crop of 1951).
4. **Order No. 87**—State of Maine, effective September 27, 1948.
5. **Order No. 92**—State of Washington, effective September 28, 1949.
6. **Order No. 98**—State of New Jersey, effective April 6, 1950.
7. **Order No. 20**—States of Massachusetts, Rhode Island, Connecticut, New Hampshire and Vermont, effective November 12, 1950.
8. **Order No. 57**—Certain Designated Counties in Idaho and Malheur County, Oregon, effective January 19, 1950.
9. **Order No. 58**—State of Colorado, effective August 30, 1941.
10. **Order No. 59**—Counties of Crook, Deschutes, Jefferson, Klamath and Lake in the State of Oregon and Siskiyou in the State of California.

ORIGIN AND HISTORY OF THE IRISH POTATO

The exact origin of the potato *Solanum tuberosum*, is in somewhat of a quandry. Scientists disagree as to the exact country where it originally occurred. Some claim Chile as the birthplace of the potato, while others believe that it first developed in Peru or Bolivia. There is agreement, however, that the tuber-bearing plant originated in the Andean section of South America, covering northern Chile, Peru, Bolivia and Ecuador. No plants are now found in this area that are identical to the first recorded descriptions.

The first written report of the potato was made by Cieca in his "Chronicles of Peru," published in Sevale, Spain, in 1553. Cieca was a young Spaniard who explored South America from 1533 to about 1550. He kept a very accurate diary of the many interesting things that he saw during his travels and refers to the potato or "papas," the Indian name, several times. He mentions the potato as one of the principal foods of the Indians.

The potato was introduced into Europe about the middle of the sixteenth century by Spaniards returning from their conquest of Peru. From Spain it was carried to Italy and Central Europe. There is considerable doubt that Sir Walter Raleigh took the potato to England from Virginia in 1586. There is no record that any plants growing in Virginia at that time closely resembled the potato growing in South America. It is possible that Raleigh's men secured the potato from a Spanish ship carrying them to Spain.

The potato had a very slow development in Europe and it wasn't until late in the eighteenth century that it became commercially important as a food crop. The potatoes' food value and large production was especially valuable to the Irish who developed it more rapidly than did the English, and it became a most important staple food early in the nineteenth century. The extent of Ireland's dependence on its food value was tragically illustrated by the failure of the potato crop in 1845 which resulted in the starvation of thousands of the inhabitants and started the great Irish immigration into this country.

MORE FOR YOUR MONEY

Many fresh fruits and vegetables are "best buys" because they provide more all-around nutrition per dollar than other foods

This table shows the quantity of nutrients available for $1 spent for each of the various commodities listed below at a representative store of a large national chain at Washington, D. C., February 6, 1951. The table provides data on a good cross-section of food including meat, dairy products, grain, tubers, root vegetables, leafy green vegetables, citrus fruit and deciduous fruit.

Commodity	Food energy Cal.*	Protein Gm.*	Fat Gm.	Total carbo-hydrate Gm.	Cal-cium Mg.*	Phos-phorus Mg.	Iron Mg.	Vita-min A I.U.*	Thia-mine Mg.	Ribo-flavin Mg.	Niacin Mg.	As-corbic acid Mg.
POTATOES	7,950	190	10	1,820	1,050	5,325	68	1,750	10.0	3.75	110.0	1,600
Apples	2,320	12	16	596	240	400	12	3,600	1.6	1.2	7.0	180
Bread [1]	7,794	241	91	1,470	2,244	2,612	50	0	6.9	4.4	62.5	0
Carrots	1,262	36	9	283	1,185	1,125	24	364,000	1.7	1.7	18.2	182
Grapefruit	1,975	25	10	503	1,095	896	10	332	1.8	0.9	10.0	2,009
Ham, Smoked	2,226	97	200	2	58	778	14	0	4.0	1.07	22.6	0
Jellies	4,236	3	0	1,092	200	200	5	185	0.3	0.4	2.6	63
Kale	889	86	13	160	4,978	1,368	49	166,820	2.3	5.7	44.0	2,546
Milk [2]	1,545	80	89	111	2,680	2,110	2	3,600	0.8	3.9	2.5	30
Onions	3,856	120	18	880	2,740	3,760	42	4,200	2.8	3.0	18.0	760
Oranges	2,102	41	10	524	1,544	1,072	19	8,866	3.6	1.3	11.4	2,316
Rutabagas	3,675	105	10	860	5,300	3,950	38	32,000	7.2	7.5	90.0	3,500
Steak, Round	672	72	41	0	41	662	11	0	0.3	0.6	17.2	0
Sweet Potatoes	5,328	77	30	1,197	1,295	2,120	30	333,333	4.1	2.22	27.7	954

[1] Enriched white bread.
[2] Fresh whole milk.
* "Cal." is calories; "Gm." is grams; "Mg." is milligrams; "I.U." is International Units.
Compiled by United Fresh Fruit & Vegetable Association, 2017 S Street N.W., Washington 9, D. C.
Additional copies of this report available from the United at $1.50 per hundred and $11 per thousand.

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Agricultural Chemicals Division
32-K Rockefeller Plaza, New York 20, N. Y.
How to Treat Potatoes with Barsprout Sprout Inhibitor
Kill Potato Tops with Aero Cynamid
'Aero' Cynamid, Agriculture's Most Useful Form of Nitrogen
The Story of 'Aero' Cynamid
Thiophos Parathion

American Excelsior Corporation
1000 North Halsted Street
Chicago 22, Illinois
A Key to Better Loading

American Potato Dryers, Inc.
Raleigh, N. C.
Literature on Waxers, Washers, Driers and Graders

John Bean Mfg. Company
Lansing 4, Mich.
Row Crop Sprayers for Two-Way Protection

The Canadian Department of Trade and Commerce
Ottawa, Ont., Canada
Canadian Certified Seed

Chipman Chemical Co.
Bound Brook, New Jersey
Chipman 1949 Insecticides, Fungicides, Weed Killers
Stop Sprout Retards Sprouting of Table Stock Potatoes
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Chipman DDT Dusts and Sprays for Agricultural Use
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You Can't Argue with Weeds
P-C-H "20" Dust
Chipman Calcium Arsenate for Potatoes and Tomatoes

Corona Chemical Division
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2000 Grant Bldg., Pittsburgh, Pa.
Literature on Potato Insect and Disease Control

Dahlman Manufacturing Co.
Grandy, Minnesota
The New Two-Row Potato Combine
Potato Digger Chain

E. I. Dupont De Nemours & Co., Inc.
Semesan Section
Wilmington 98, Delaware
Semesan Bel for Higher Yields and Better Quality Irish and Sweet Potatoes

Exact Weight Scale Co.
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Columbus, Ohio
Free Literature on Scales

The John Deere Co.
Moline, Illinois
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John Deere Spring-Tooth Harrows Weed Destroyers
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Faesy and Besthoff, Inc.
325 Spring St., N. Y. 13, N. Y.
Information on Micro NU-COP

General Chemical Division
Allied Chemical & Dye Corporation
40 Rector Street, New York 6, N. Y.
DDT "The Complete Dusting Guide for Potatoes"
DDT "The Complete Potato Spray and Dust Guide"
Genicop Spray Powder DDT-Copper "How to Spray Efficiently, Economically for Better Potato Yields"
Spray Guide for Fruits and Vegetables

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Information on Potato and Onion Graders

Lockwood Graders
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Information on Complete Lines of Potato Machinery

Moulton Irrigation Co.
Withrow, Minn.
Catalogue of The Moulton Portable Irrigation System
Controlled Rainfall for Bigger and Better Crops

Division of Plant Industry
Dept. of Agriculture
State House, Augusta, Maine
State of Maine "Blue Tag" Certified Seed Potatoes

(Continued on Page 69)

Seed Potato Inspection and Certification
University Farms
St. Paul, Minn.
Minnesota Certified Seed Potatoes

New York Certified Seed Growers' Cooperative
320 Plant Science Bldg.
Ithaca, N. Y.
List of Certified Seed Growers

New York Coop. Seed Potato Ass'n. Inc.
Information on Certified Brand Seed Potatoes

New York Mercantile Exchange
Hudson and Harrison Streets
New York 13, N. Y.
Information on Future Trading in Potatoes

Nebraska Certified Potato Growers
Alliance, Neb.
Information on Nebraska Certified Seed Potatoes

(Continued on Page 70)

State Seed Department
College Station, Fargo, N. Dak.
Information on North Dakota Certified Seed Potatoes

The Ohio Hydrate & Supply Co.
Woodville, Ohio
Agricultural Limestone
Ohio Super Spray Hydrated Lime for All Spraying and Dusting Needs

Pennsylvania Salt Mfg. Co.
Philadelphia 7, Pa.
Literature on Potato Dusts, Sprays and Penites, for Killing Potato Tops

Phelps Dodge Refining Corp.
40 Wall Street, New York, N. Y.
Bordeaux Mixture—Its Preparation and Use
Basic Copper Sulphate for Your Sprays and Dusts
Zinc Sulphate As Used in Agriculture

Potato Association of America
New Brunswick, N. J.
American Potato Journal

Rohm & Haas Company
Washington Square, Philadelphia 5, Pa.
A Message for Potato Growers
Bigger Yields of Quality Vegetables
Better Quality—Higher Yields from Superior Disease Control

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Information on Potato and Onion Car Floor Pads

WORLD POTATO PRODUCTION

1950-51 WORLD POTATO PRODUCTION ABOVE RECENT YEARS

World potato production in the 1950-51 season is estimated at 8.6 billion bushels, about 3 percent above the prewar 1935-39 average of 8.3 billion bushels and more than 6 percent above the 1949-50 crop of 8.1 billion bushels. The increase from prewar was paralleled by a similar, although slightly greater, increase in acreage planted to potatoes. The 1950-51 world acreage was estimated at 53 million acres or 4 percent above the 51 million in the prewar 1935-39 period. The 1949-50 acreage was almost identical with this season which means that the 6 percent increase of production this year above last results wholly from improved production conditions, mostly weather.

The average yield in 1950-51 was estimated at 163 bushels per acre compared to 163 prewar, 156 bushels average in the wartime period 1940-44 and 153 bushels in 1949-50.

This summary includes 70 countries for which all of the 1950-51 figures are preliminary. Estimates for the Southern Hemisphere are very tentative as they include crops not yet harvested. Only about 2 percent of the world's potato crop, however, is produced in the Southern Hemisphere.

Europe: Europe, including the Soviet Union, is the center of the world's potato production. Ninety percent of the world's crop was produced there in 1950-51. The Soviet Union alone produced about 2.8 billion bushels or 33 percent of the world total. Europe, including the Soviet Union, produced an estimated 7.7 billion bushels in 1950. This compares with 7.2 billion last year and 7.6 billion prewar.

North America: North America is expected to produce about 530 million bushels in 1950 which is 24 percent more than the prewar average of 427 million bushels, 13 percent more than the 1940-44 wartime average and 6 percent more than the 500 million bushels estimated for 1949. Potato acreage in North America, on the other hand, was 32 percent less than in the prewar 1935-39 period. These

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(Established under the Research and Marketing Act)

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figures represent largely the United States and Canada as 98 percent of the total North American production is in these two countries

Yields in North America have increased from 117 bushels per acre prewar to 135 bushels average in 1940-44, to 197 in 1949, and 215 bushels in 1950.

Asia, South America, Africa, and Oceania: Very significant increases of production have occurred since prewar in the smaller producing areas of Asia, Africa, South America, and Oceania. These increases, however, are significant only in the areas themselves and not as they affect world totals. The 1950-51 production in these scattered areas is currently estimated at 30 to 90 percent above the prewar levels. Except for Oceania, the increase in production, which has paralleled the increase in acreage indicates a significant increase in the use of Irish potatoes by the population in these developing areas.

This is one of a series of regularly scheduled reports on world agricultural production approved by the Office of Foreign Agricultural Relations Committee on Foreign Crop and Livestock Statistics. It is based in part upon U. S. Foreign Service reports.

POTATOES: ACREAGE, YIELD AND PRODUCTION IN SPECIFIED COUNTRIES, AVERAGES 1935-39 AND 1940-44, ANNUAL 1949-50

Continent and country	Acreage Average 1940-44	Acreage 1949	Acreage 1950 [1]	Yield per acre Average 1940-44	Yield per acre 1949	Yield per acre 1950 [1]	Production Average 1940-44	Production 1949	Production 1950 [1]
	1,000 acres	1,000 acres	1,000 acres	Bu.	Bu.	Bu.	1,000 bushels	1,000 bushels	1,000 bushels
North America									
Canada	547	521	517	136	174	182	74,495	90,697	94,126
El Salvador	1	2	2	32	50	50	32	100	100
Guatemala	10	10	10	46	47	47	463	467	470
Honduras	3	4	4	17	39	38	50	155	150
Mexico	60	74	74	65	67	67	3,892	4,960	4,960
Panama, Republic of	1	1	1	60	70	70	60	70	70
United States	2,844	1,901	1,826	137	211	234	388,765	401,962	426,782
Bermuda	2	1	1	45	45	45	90	12	12
Cuba	14	23	25	128	137	140	1,792	3,144	3,500
Dominican Republic	3	3	3	30	45	45	89	45	45
Jamaica	2	3	3	39	27	27	77	80	80
Total	3,487	2,543	2,466	135	197	215	469,805	501,692	530,295
Europe									
Albania	2	3	3	50	50	50	100	150	150
Austria	443	470	485	182	172	171	80,707	80,800	83,000
Belgium	258	220	245 [2]	291	342	344 [2]	75,030	75,219	84,380
Bulgaria	78	40	45	86	88	67	6,693	3,500	3,000
Czechoslovakia	1,761	1,404	1,500	146	167	183	257,865	234,610	275,000
Denmark	219	262	256	258	252	258	56,480	65,918	66,138
Finland	164	214	215	209	199	211	34,326	42,514	45,415
France	3,014	2,723	2,750	137	148	192	413,375	403,295	529,104
Germany:									
Western Zone	2,627	2,800	2,800	252	274	341	662,600	767,000	955,327
Eastern Zone	1,900	2,000	2,000	266	220	275	505,000	441,000	550,000
Greece	54	88	87	60	165	152	3,218	14,498	13,228
Hungary	896	680	680	109	103	66	97,657	70,000	45,000
Iceland	2	2	2	150	145	150	435	290	300
Ireland (Eire)	408	350	337	293	287	277	119,713	100,509	93,333
Italy	1,046	964	960	93	100	97	97,283	95,974	93,071
Luxembourg	27	20	20	205	148	150	5,522	2,968	3,000
Malta	6	7	7	85	70	69	508	490	480
Netherlands	448	433	407	308	391	364	137,987	169,209	148,276
Norway	175	144	146	247	280	301	43,158	40,370	43,974
Poland	6,500	6,272	6,400	181	181	178	1,176,000	1,135,390	1,140,000
Portugal	148	207	238	192	126	143	28,398	26,025	34,019
Rumania	493	440	450	112	91	67	55,355	40,000	30,000
Spain	1,090	900	900	127	117	128	138,676	105,000	115,000
Sweden	346	333	321	208	190	206	72,100	63,188	66,013
Switzerland	172	131	137	289	214	300	49,750	28,072	41,153
United Kingdom	1,213	1,308	1,240	263	258	284	318,976	337,307	351,680
Yugoslavia	727	771	770	105	97	65	76,042	75,000	50,000
Total (excl. U.S.S.R.)	24,217	23,186	23,401	186	191	208	4,512,954	4,418,296	4,860,041
U.S.S.R. (Europe and Asia)	21,000	23,400	23,400	133	120	122	2,800,000	2,800,000	2,850,000

(Continued on Page 74)

POTATOES: ACREAGE, YIELD AND PRODUCTION IN SPECIFIED COUNTRIES, AVERAGES 1935-39 AND 1940-44, ANNUAL 1949-50

Continent and country	Acreage			Yield per acre			Production		
	Average 1940-44	1949	1950[1]	Average 1940-44	1949	1950[1]	Average 1940-44	1949	1950[1]
	1,000 acres	1,000 acres	1,000 acres	Bu.	Bu.	Bu.	1,000 bushels	1,000 bushels	1,000 bushels
Asia									
Cyprus	7	9	9	120	141	144	843	1,334	1,300
Israel [3]	4	4	4	235	250	250	940	1,000	1,000
Lebanon	[4]	12	10	[4]	122	118	[4]	1,470	1,176
Syria	[5]13	9	9	[5]101	117	111	[5]1,311	1,066	1,000
Turkey	176	175	180	62	99	125	10,946	17,306	22,560
Japan	467	546	507	152	148	150	70,818	80,578	76,215
North Korea	261	260	260	69	65	62	17,937	17,000	16,000
South Korea	82	119	120	70	65	58	5,763	7,780	7,000
Indonesia	13	18	18	79	56	56	1,025	1,000	1,000
Philippines, Republic of	1	1	1	70	70	70	8	8	8
Total	1,024	1,153	1,118	107	111	114	109,591	128,542	127,259
South America									
Argentina	472	457	460	93	97	96	43,741	44,533	44,000
Brazil	219	408	410	82	74	73	17,973	30,088	30,000
Chile	132	128	130	129	130	131	17,047	16,695	17,000
Colombia	221	262	250	67	55	58	14,786	14,514	14,500
Ecuador	62	62	60	66	25	67	4,092	1,521	4,000
Peru	347	544	545	69	88	88	24,045	47,766	48,000
Uruguay	25	21	20	54	64	65	1,345	1,339	1,300
Venezuela	30	12	12	28	56	54	827	666	650
Total	1,508	1,894	1,887	82	83	84	123,856	157,122	159,450
Africa									
Algeria	38	82	80	91	81	78	3,453	6,605	6,210
Belgian Congo	6	7	7	51	71	71	313	500	500
Egypt	21	36	37	143	261	243	3,010	9,397	9,000
Eritrea	2	2	2	36	38	38	55	75	75
Madagascar	29	55	55	61	37	36	1,764	2,049	2,000
Mauritius	1	1	1	75	100	100	24	100	100
Mozambique	2	1	1	86	120	120	91	120	120
Nigeria and Cameroons	2	1	1	37	40	40	54	40	40
Southern Rhodesia	4	4	4	101	100	100	376	400	400
Tunisia	4	5	5	119	142	140	451	772	700
Union of South Africa	90	170	170	69	59	59	6,252	10,000	10,000
Total	199	364	363	80	83	80	15,843	30,058	29,145
Oceania									
Australia	157	132	130	131	168	154	20,578	22,213	20,000
New Zealand	23	18	18	198	249	222	[2]4,554	4,480	4,000
Total	180	150	148	140	178	162	25,132	26,693	24,000
World total	51,615	52,690	52,783	156	153	163	8,057,181	8,062,403	8,580,190

[1] Preliminary. [2] Not comparable with later years as prewar years apparently include small farms and gardens. [3] Jewish farming only. [4] Included with Syria. [5] Includes Lebanon.

Office of Foreign Agricultural Relations. Prepared or estimated on the basis of official statistics of foreign governments, reports of the U. S. Foreign Service officers, results of office research and other information. Years shown refer to year of harvest in the Northern Hemisphere and includes the harvest immediately following in the Southern Hemisphere. Averages are for years stated or for the nearest comparable period. The yields per acre for countries having a small production were calculated on the basis of unrounded estimates of acreage.

PRICES AND VALUES OF 1949 AND 1950 CROPS, BY STATES—POTATOES[1]

GROUP AND STATE	Season average price per bushel received by farmers		Value of production[3]	
	1949	1950[2]	1949	1950[2]
	Dollars		Thousand dollars	
SURPLUS LATE POTATO STATES:				
Maine	1.00	.80	70,215	49,400
New York	1.12	.70	34,339	24,020
Pennsylvania	1.31	1.05	25,097	19,451
3 EASTERN	1.08	.810	129,651	92,871
Michigan	1.25	1.00	21,450	17,460
Wisconsin	1.42	1.25	19,312	18,769
Minnesota	1.19	.95	20,230	16,758
North Dakota	1.15	.90	24,892	20,007
South Dakota	1.72	1.45	2,167	3,262
5 CENTRAL	1.25	1.02	88,051	76,256
Nebraska	1.21	.75	10,696	8,726
Montana	1.61	1.50	3,743	3,885
Idaho	1.08	.65	38,880	30,296
Wyoming	1.75	1.10	3,272	2,367
Colorado	1.38	1.10	25,958	20,460
Utah	1.37	1.15	4,642	3,835
Nevada	1.43	1.30	566	608
Washington	1.38	1.20	13,910	14,136
Oregon	1.27	.95	15,100	12,540
California	1.44	1.15	64,973	53,941
10 WESTERN	1.31	.959	181,740	150,794
TOTAL 18 SURPLUS LATE	1.21	.923	399,442	319,921

(Continued on Page 76)

PRICES AND VALUES OF 1949 AND 1950 CROPS, BY STATES, POTATOES[1] (Continued)

GROUP AND STATE	Season average price per bushel received by farmers		Value of production[3]	
	1949	1950[2]	1949	1950[2]
	Dollars		Thousand dollars	
OTHER LATE POTATO STATES:				
New Hampshire	1.60	1.30	1,549	1,274
Vermont	1.59	1.35	1,794	1,474
Massachusetts	1.69	1.25	4,816	3,520
Rhode Island	1.66	1.25	1,926	1,594
Connecticut	1.60	1.15	4,821	4,003
West Virginia	1.83	1.60	3,825	3,168
Ohio	1.60	1.35	10,032	10,260
Indiana	1.72	1.50	6,708	7,268
Illinois	1.78	1.50	1,780	1,323
Iowa	1.77	1.60	1,947	2,080
New Mexico	1.58	1.45	389	348
TOTAL 11 OTHER LATE	1.67	1.37	39,587	36,312
29 LATE STATES	1.24	.955	439,029	356,233
INTERMEDIATE POTATO STATES:				
New Jersey	1.27	.83	10,864	10,773
Delaware	1.56	1.20	764	754
Maryland	1.51	1.30	2,396	2,163
Virginia	1.42	.95	12,959	8,935
Kentucky	1.41	.95	3,849	2,297
Missouri	1.49	1.30	3,624	3,050
Kansas	1.18	1.20	1,315	1,270
Arizona	2.05	1.30	2,599	2,215
TOTAL 8 INTERMEDIATE	1.41	.977	38,370	31,459
37 LATE AND INTERMEDIATE	1.25	.957	447,399	387,692
EARLY POTATO STATES:				
North Carolina	1.35	.80	10,971	8,294
South Carolina	1.93	1.34	3,184	2,369
Georgia	1.79	1.45	2,320	1,810
Florida	2.30	1.67	12,484	9,459
Tennessee	1.50	1.08	3,345	2,376
Alabama	1.82	1.31	6,246	5,181
Mississippi	2.26	1.75	2,531	1,811
Arkansas	1.61	1.30	3,349	2,422
Louisiana	1.91	1.58	2,366	2,190
Oklahoma	1.60	1.20	1,302	1,044
Texas	1.70	1.53	6,266	4,211
TOTAL 11 EARLY STATES[4]	1.75	1.24	54,394	41,167
TOTAL UNITED STATES	1.29	.979	531,793	428,859

[1] Estimates for each State cover the entire crop, whether commercial or noncommercial, early or late.

[2] The 1950 price and value figures are preliminary.

[3] Production for 1950 in Nebraska and California includes some quantities of commercial early potatoes not marketed and excluded in computing value.

[4] List of early States excludes California. Average price and total value of all California potatoes shown under surplus late States.

For potatoes, the beginning of the crop marketing season varies between States from December 1 preceding the year shown for Florida and Texas to August 1 of the year shown for certain northern States. The marketing season comprises 12 months in all States except California, which has a 14-month season beginning April 1 of the year shown.

Source: Agricultural Prices (U.S.D.A. Bureau of Agricultural Economics).

BUYER'S GUIDE

The firms listed below have materials or supplies of interest to those in the Potato Industry.

(Names set in BLACK TYPE indicate that the company has an advertisement on another page.)

AIR CONDITIONING UNITS
(For Potato Storage)
American Potato Dryers, Inc., 510 Glenwood Ave., Raleigh, N. C.
United States Air Conditioning Corporation, Como Ave., Southeast at 33rd, Minneapolis 14, Minn.

AUTOMATIC ELECTRIC BOILERS
Siebring Mfg. Co., George, Iowa.

BAG CLOSERS
American Potato Dryers, Inc., 510 Glenwood Ave., Raleigh, N. C.

BAG LOADERS
Paramount Manufacturing Co., 1615 East Main St., Stockton, Calif.
King-Wyse, Inc., Archbold, Ohio.
Singer Mfg. Co., Smithville, Ohio.
The Trescott Company, Inc., Dept. Y, Fairport, N. Y.

BAGGING MACHINE
American Potato Dryers, Inc., 510 Glenwood Ave., Raleigh, N. C.
John Bean Mfg. Co., Lansing 4, Mich.
King-Wyse, Inc., Archbold, Ohio.
Paramount Manufacturing Co., 1615 East Main St., Stockton, Calif.

BAGS (Burlap)
American Bag and Burlap Co., 32 Arlington St., Chelsea 50, Mass.
Chase Bag Co., 309 West Jackson Blvd., Chicago, Ill.
Gittlin Bag Co., 250 Elizabeth Ave., P. O. Box 1060, Newark, N. J.
Max Katz Bag Co., 312-16 S. New Jersey St., Indianapolis 4, Ind.
Seaman Bag Company, 2512 S. Damen Ave., Chicago 8, Ill.

BAGS (Paper)
Chase Bag Co., 309 West Jackson Blvd., Chicago, Ill.
Equitable Paper Bag Co., 45-50 Van Dam St., Long Island City 1, N. Y.
Max Katz Bag Co., 312-16 S. New Jersey St., Indianapolis 4, Ind.
Seaman Bag Company, 2512 S. Damen Avenue, Chicago 8, Ill.
C. E. Stevens Bros., Inc., 12 West Barre St., Baltimore 1, Md.

BARRELS (Potato)
Atlantic Cooperage Company, 52 Maple Street, Brewer, Maine.

BASKETS
Washburn Company, 1802 Preston St., Rockford, Ill.

BIN LOADERS
King-Wyse, Inc., Archbold, Ohio.
Lockwood Graders, Gering, Neb., and Grand Forks, N. D.
Paramount Manufacturing Co., 1615 East Main St., Stockton, Calif.
Singer Mfg. Co., Smithville, Ohio.
The Trescott Company, Dept. Y, Fairport, N. Y.

BROKERS (Potato Futures)
Merrill Lynch, Pierce, Fenner and Beane, 70 Pine St., New York 5, N. Y.
Merrill Lynch, Pierce, Fenner and Beane, Board of Trade Bldg., Chicago 4, Ill.
New York Mercantile Exchange, 6 Harrison St., New York 13, N. Y.
A. L. Stamm and Co., 120 Broadway, New York 5, N. Y. (Attention Harry H. Wolfe.)

CAR FLOOR PAD
American Excelsior Corp., 1000 N. Halsted St., Chicago 22, Ill.
Jiffy Manufacturing Co., 360 Florence Ave., Hillside 5, N. J.
Washington Excelsior & Mfg. Co., 871 Othell St., Seattle, Wash.

CONVEYORS
American Potato Dryers, Inc., 510 Glenwood Ave., Raleigh, N. C.

CRATES
Atlantic Cooperage Co., 52 Maple St., Brewer, Maine.

CULTIVATORS
Deere and Company, Moline, Ill.

CUTTERS
Lockwood Graders, Gering, Neb., and Grand Forks, N. D.
Albert E. Trexler, P.O. Lenhartsville, Pa.

DIGGERS (Elevator)
John Bean Mfg. Co., Lansing 4, Mich.
Deere and Company, Moline, Ill.

DISINFECTANTS (Seed)
E. I. duPont de Nemours & Co., Wilmington 98, Del.
Faesy and Besthoff, Inc., 325 Spring St., New York 13, N. Y.

DISTRIBUTORS (Fertilizers, Lime, etc.)
American Cyanamid Company, 32-K Rockefeller Plaza, New York 20, N. Y.
Deere and Company, Moline, Ill.
Phelps Dodge Refining Corp., 40 Wall St., New York 5, N. Y.

DRILLS (Grain and Grass)
Deere and Company, Moline, Ill.

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BUYER'S GUIDE (Continued)

DRYERS

American Potato Dryers, Inc., 510 Glenwood Avenue, Raleigh, North Carolina.
John Bean Mfg. Co., Lansing 4, Mich.
Lockwood Graders, Inc., Gering, Nebr. and Grand Forks, N. D.

FERTILIZERS

American Cyanamid Company, Agricultural Chemical Division, 32-K Rockefeller Plaza, New York 20, N. Y.
Faesy and Besthoff, Inc., 325 Spring St., New York 13, N. Y.
Int'l Minerals & Chem. Corp., 20 No. Wacker Dr., Chicago 6, Ill.
Miller Chemical and Fertilizer Corporation, 100 South Caroline St., Baltimore 31, Md.
Nebraska Certified Potato Growers, Alliance, Neb.
Ohio Hydrate & Supply Co., Main St., Woodville, Ohio.
Phelps Dodge Refining Corp., 40 Wall St., New York 5, N. Y.
Summers Fertilizer Co., 604 Stock Exchange Bldg., Baltimore 2, Md.
Tennessee Corporation, 619 Grant Bldg., Atlanta 1, Ga.

FERTILIZER MACHINES

Deere and Company, Moline, Ill.

FUMIGANTS

American Cyanamid Company, 32-K Rockefeller Plaza, New York 20, N. Y.

FUNGICIDES

Carbide and Carbon Chemicals Corp. (Unit of Union Carbide and Carbon Corp.), 30 East 42nd St., New York 17, N. Y.
Chipman Chem. Co., Inc., Bound Brook, N. J.
Corona Chemical Division (Pittsburgh Plate Glass Co.), Pittsburgh 19, Pa.
E. I. duPont de Nemours & Co., Wilmington 98, Del.
General Chemical Division, Allied Chemical and Dye Corp., 40 Rector St., New York 6, N. Y.
Faesy and Besthoff, Inc., 325 Spring St., New York 13, N. Y.
Nebraska Certified Potato Growers, Alliance, Neb.
Penn's Manor Products, Simons and Dungan Aves., Cornwell's Heights, Penna.
Pennsylvania Salt Mfg. Co., 1000 Widener Bldg., Philadelphia 7, Pa.
Phelps Dodge Refining Corp., 40 Wall St., New York 5, N. Y.
Pittsburgh Agricultural Chemical Co., 350 Fifth Ave., New York 1, N. Y.
Rohm and Haas Co., West Washington Square, Philadelphia 5, Pa.
Tennessee Corporation, 619 Grant Bldg., Atlanta 1, Ga.

GRADERS & SORTERS

American Potato Dryers, Inc., 510 Glenwood Avenue, Raleigh, N. C.
John Bean Mfg. Co., Lansing 4, Mich.
Boggs Mfg. Corp., Atlanta, N. Y.
King-Wyse, Inc., Archbold, Ohio.
Lockwood Graders, Inc., Gering, Nebr. and Grand Forks, N. D.
Paramount Manufacturing Co., 1615 East Main St., Stockton, Calif.
Singer Mfg. Co., Smithville, Ohio.
The Trescott Company, Dept. Y, Fairport, N. Y.

HARROWS (Disc)

Deere and Company, Moline, Ill.

HARROWS (Spring Tooth)

Deere and Company, Moline, Ill.

HERBICIDES

Carbide and Carbon Chemicals Corp. (Unit of Union Carbide and Carbon Corp.), 30 East 42nd St., New York 17, N. Y.
Faesy and Besthoff, Inc., 325 Spring St., New York 13, N. Y.
Penn's Manor Products, Simons and Dungan Aves., Cornwell's Heights, Penna.

INSECTICIDES

Amer. Cyanamid Co., Agr. Chem. Div. 32-K Rockefeller Plaza, New York 20, N. Y.
Chipman Chem. Co., Inc., Bound Brook, N. J.
Corona Chemical Division, Pittsburgh Plate Glass Co., 2000 Grant Bldg., Pittsburgh 19, Pa.
E. I. duPont de Nemours & Co., Wilmington 98, Del.
Faesy and Besthoff, Inc., 325 Spring St., New York 13, N. Y.
General Chemical Division, Allied Chemical and Dye Corp., 40 Rector St., New York 6, N. Y.
Miller Chemical and Fertilizer Corporation, 1000 South Caroline St., Baltimore 31, Md.
Nebraska Certified Potato Growers, Alliance, Neb.
Penn's Manor Products, Simons and Dungan Aves., Cornwell's Heights, Penna.
Pennsylvania Salt Mfg., 1000 Widener Building, Philadelphia 7, Pa.
Pittsburgh Agricultural Chemical Co., 350 Fifth Ave., New York 1, N. Y.
Rohm and Haas Co., West Washington Square, Philadelphia 5, Pa.

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INSPECTION TABLES
The Trescott Company, Dept. Y, Fairport, N. Y.

IRRIGATION & DRAINAGE EQUIPMENT

Couplings (Pipe)
Irrigation Equipment Co., Inc., Eugene, Ore.

Pipe (Portable Irrigation)
Irrigation Equipment Co., Inc., Eugene, Ore.
Moulton Irrigation Company, Withrow, Minn.

Pumps
Moulton Irrigation Company, Withrow, Minn.

Sprinklers
Moulton Irrigation Company, Withrow, Minn.
Rain Bird Sprinkler Mfg. Corp., 19233 E. Foothill Blvd., Glendora, Calif.

LIME & LIMESTONE
The Ohio Hydrate & Supply Co., Main St., Woodville, Ohio.

MINERALS
Tennessee Corporation, 619 Grant Bldg., Atlanta 1, Ga.

MIST BLOWERS
John Bean Mfg. Co., Lansing 4, Mich.

PACKAGING EQUIPMENT
American Potato Dryers, Inc., 510 Glenwood Ave., Raleigh, N. C.

PICKERS & BAGGERS
John Bean Mfg. Co., Lansing 4, Mich.
Dahlman Mfg. Co., Grandy, Minn.
The Trescott Company, Dept. Y, Fairport, N. Y.

PLANTERS
Deere and Company, Moline, Ill.
Nebraska Certified Potato Growers, Alliance, Neb.

PLOWS (Tractor)
Deere and Company, Moline, Ill.

PRE-COOLERS
American Potato Dryers, Inc., 510 Glenwood Ave., Raleigh, N. C.

PUBLISHERS (Books on Potatoes)
American Potato Yearbook, 319 Scotch Plains Ave., Westfield, N. J.
Comstock Publishing Company, 124 Roberts Place, Ithaca, N. Y. (Hardenburg, E. V., Potato Production) 281 pages, 63 tables, $3.00.

SCALES
Exact Weight Scale Co., 944 West Fifth Ave., Columbus 12, Ohio.
King-Wyse, Inc., Archbold, Ohio.

SCOOPS (Potato)
Albert E. Trexler, Lenhartsville, Pa.
The Washburn Company, Worcester 8, Mass., and Rockford, Ill.

SEALS (Metal Protective)
E. J. Brooks Company, 159 North 13th St., Newark 7, N. J.

SEEDS (Potato)
Canadian Dept. of Trade and Commerce, Ottawa, Ont.
Clark Seed Farms, Richford, N. Y.
Maine Development Association, Augusta, Maine.
Minnesota State Dept. of Agr., Seed Potato Certification, St. Paul, Minn.
Nebraska Certified Potato Growers, Alliance, Neb.
N. Y. Cooperative Seed Potato Ass'n, Inc., Georgetown, N. Y.
N. Y. Certified Seed Growers Cooperative Inc., 320 Plant Science Bldg., Ithaca, N. Y.
North Dakota State Seed Dept., College Station, Fargo, N. D.
South Dakota Potato Growers Association, Watertown, S. Dak.

SEED TREATING EQUIPMENT
Lockwood Graders, Gehring, Nebr., and Grand Forks, N. D.

SOIL TESTING OUTFITS
The Edwards Laboratory, P. O. Box 2742, Cleveland 11, Ohio.

SPRAY DISC
John Bean Mfg. Co., Lansing 4, Mich.

SPRAYERS & DUSTERS
John Bean Mfg. Co., Lansing 4, Mich.
Deere and Company, Moline, Ill.
Singer Mfg. Co., Smithville, Ohio.

SPROUT INHIBITORS
American Cyanamid Co., Agr. Chem. Div., 32-K Rockefeller Plaza, New York 20, N. Y.
Chipman Chem. Co., Inc., Bound Brook, N. J.

TAGS
(Shipping, Paper, Cloth, Plain or Printed)
Keener Manufacturing Co., 428 West Lemon St., Lancaster, Penna.

TRACTORS (Farm)
Deere and Company, Moline, Ill.

VENTILATING FANS
United States Air Conditioning Corp., Como Ave., S.E., at 33rd, Minneapolis 14, Minn.

VINE KILLERS (Chemical)
American Cyanamid Company, Agricultural Chemicals Division, 30 Rockefeller Plaza, New York 20, N. Y.
Chipman Chemical Co., Inc., Bound Brook, N. J.
Faesy and Besthoff, Inc., 325 Spring St., New York 13, N. Y.
Pennsylvania Salt Manufacturing Co., 1000 Widener Bldg., Philadelphia 7, Pa.

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WAREHOUSE EQUIPMENT

American Potato Dryers, Inc., 510 Glenwood Ave., Raleigh, N. C.
John Bean Mfg. Co., Lansing 4, Mich.
King-Wyse, Inc., Archbold, Ohio.
Paramount Manufacturing Co., 1615 East Main Street, Stockton, Calif.

WASHERS

American Potato Dryers, Inc., 510 Glenwood Ave., Raleigh, N. C.
John Bean Mfg. Co., Lansing 4, Mich.
Lockwood Graders, Inc., Gering, Nebr., and Grand Forks, N. D.
Paramount Manufacturing Co., 1615 East Main St., Stockton, Calif.

WAXERS

American Potato Dryers, Inc., 510 Glenwood Ave., Raleigh, N. C.

WAXING (Potatoes)

John Bean Mfg. Co., Lansing 4, Mich.
S. C. Johnson and Son, Inc., Racine, Wisc.

Lockwood Graders, Inc., Gering, Nebr., and Grand Forks, N. D.
Paramount Manufacturing Co., 1615 East Main St., Stockton, Calif.

WEED KILLERS (Chemical)

American Cyanamid Company, Agricultural Chemicals Division, 30 Rockefeller Plaza, New York 20, N. Y.
Carbide and Carbon Chemicals Corp. (Unit of Union Carbide and Carbon Corp.), 30 East 42nd St., New York 17, N. Y.
Chipman Chem. Co., Inc., Bound Brook, N. J.
E. I. duPont de Nemours & Co., Wilmington 98, Del.
Faesy and Besthoff, Inc., 325 Spring St., New York 13, N. Y.
General Chemical Division, Allied Chemical and Dye Corp., 40 Rector St., New York 6, N. Y.
Pennsylvania Salt Mfg. Co., 1000 Widener Bldg., Philadelphia 7, Pa.
Pittsburgh Agricultural Chemical Co., 350 Fifth Ave., New York 1, N. Y.

INDEX TO ADVERTISERS

AMOUNT OF SEED REQUIRED

Number of bushels of potatoes required to plant an acre at different spacings with seed pieces of various sizes[1]

Spacing of rows and seed pieces	Bushels of seed required per acre, with average weight of seed pieces as given						
	½ oz.	¾ oz.	1 oz.	1¼ ozs.	1½ ozs.	1¾ ozs.	2 ozs.
Rows 32 inches apart:							
8-inch spacing	12.8	19.1	25.5	31.9	38.3	44.7	51.1
10-inch spacing	10.2	15.3	20.4	25.5	30.6	35.7	40.8
12-inch spacing	8.5	12.8	17.0	21.3	25.6	29.8	34.0
14-inch spacing	7.3	10.9	14.6	18.2	21.9	25.5	29.2
Rows 34 inches apart:							
8-inch spacing	12.0	18.0	24.0	30.0	36.0	42.0	48.0
10-inch spacing	9.6	14.4	19.2	24.0	28.3	33.6	38.4
12-inch spacing	8.0	12.0	16.0	20.0	24.0	28.0	32.0
14-inch spacing	6.9	10.3	13.7	17.1	20.6	24.0	27.4
Rows 36 inches apart:							
8-inch spacing	11.3	17.0	22.7	28.4	34.0	39.7	45.4
10-inch spacing	9.1	13.6	18.1	22.7	27.2	31.7	36.3
12-inch spacing	7.6	11.3	15.1	18.9	22.7	26.5	30.2
14-inch spacing	6.5	9.7	13.0	16.2	19.4	22.7	25.9

[1] The Potato, Wm. Stuart, (1937) J. B. Lippincott Company.

Why YOU Should Join The POTATO ASSOCIATION of AMERICA

What it IS

An organization founded in 1913 to bring together and disseminate information to all individuals interested in the production, transportation, distribution and utilization of potatoes, and the promotion of the potato industry in all its phases.

What it DOES

- Publishes the *American Potato Journal,* monthly, giving: timely data on the crop from all producing states and provinces of Canada; popular and technical articles on all phases of production, marketing and research; reviews of books and articles of general interest on potatoes. The only national publication devoted exclusively to the betterment of the potato industry.
- Holds Annual Meetings, bringing together research workers, growers, shippers, certification officials and others interested in potatoes to discuss new developments in the potato industry.

Advantages of Membership:

- Yearly subscription to the *American Potato Journal* (12 issues)
- Copy of American Potato Year Book (U. S. A. and Canada)
- Privilege of attending annual meeting

Membership Fees:

Single membership, $4.00 per year U. S. A. and foreign countries.
Group memberships received at one time.

26 to 50, $1.75 each
51 to 100, $1.50 each
over 100, $1.00 each

Make checks payable to "The Potato Association of America" and mail to John C. Campbell, Treas., New Jersey Agricultural Experiment Sta., New Brunswick, N. J.